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MONTHLY WEATHER REVIEW

JULY 1947

CONTENTS

METEOROLOGICAL AND CLIMATOLOGICAL DATA:	Page
Aerological Observations	121
River Stages and Floods	126
Climatological Data	129

SOLAR RADIATION AND SUNSPOT DATA:	Page
Solar Radiation Observations	138
Positions, Areas, and Counts of Sunspots	140
Provisional Relative Sunspot Numbers for July 1947	142

CHARTS I–XI. (Chart VII, Snowfall, omitted until November.)

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MONTHLY WEATHER REVIEW

Acting Editor, Robert N. Culnan

VOL. 75, No. 7
W. B. No. 1492

JULY 1947

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METEOROLOGICAL AND CLIMATOLOGICAL DATA FOR JULY 1947

AEROLOGICAL OBSERVATIONS

[For description of change in Table 1 and charts, see REVIEW, January 1946, p. 6]

TABLE 1.—*Mean dynamic height (geopotential) in units of 0.98 dynamic meters, temperature in degrees centigrade, and relative humidity in percent, for standard pressures, as obtained by radiosondes during July 1947*

STATIONS AND MEAN SURFACE PRESSURES

Standard pressure surface (mb.)	Albany, N. Y. (1,004.1 mb.)				Albuquerque, N. Mex. (839.3 mb.)				Apalachicola, Fla. (1,016.3 mb.)				Atlanta, Ga. (982.5 mb.)				Auburn, Calif. (956.5 mb.)				Big Spring, Tex. (927.2 mb.)				Bismarck, N. Dak. (955.2 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	31	86	19.9	85	31	1,620	27.9	28	31	5	25.7	79	31	300	23.6	69	31	501	24.8	30	31	774	29.5	39	31	505	23.6	68
1,000	31	121	20.1	83	31	32	(*)	----	31	147	25.3	76	31	145	(*)	----	31	106	(*)	----	31	93	(*)	----	31	100	(*)	----
950	31	571	19.0	78	31	511	(*)	----	31	602	22.7	74	31	597	23.2	63	31	563	24.5	30	31	557	(*)	----	31	554	23.4	64
900	31	1,028	15.9	79	31	1,000	(*)	----	31	1,066	19.8	72	31	1,065	19.9	66	31	1,031	21.3	30	31	1,039	28.6	36	31	1,025	21.7	53
850	31	1,512	12.7	80	31	1,506	(*)	----	31	1,557	16.7	71	31	1,555	16.2	69	31	1,522	17.7	29	31	1,545	24.5	40	31	1,518	18.0	55
800	31	2,019	9.3	79	31	2,042	25.4	27	31	2,072	13.7	63	31	2,068	12.5	69	31	2,036	14.2	25	31	2,072	20.0	48	31	2,034	14.5	51
750	31	2,559	6.1	75	31	2,608	21.1	29	31	2,618	10.4	61	31	2,610	9.0	63	31	2,583	10.9	----	31	2,624	15.1	57	31	2,583	11.2	46
700	31	3,114	2.9	73	31	3,196	15.9	35	31	3,184	7.1	54	31	3,175	5.7	54	31	3,147	7.3	----	31	3,206	10.6	61	31	3,149	7.8	38
650	30	3,718	−.1	66	31	3,821	10.4	43	31	3,796	3.6	48	31	3,781	2.6	45	30	3,751	3.1	----	31	3,820	6.6	52	31	3,760	3.6	38
600	29	4,350	−3.7	55	31	4,480	4.7	50	30	4,438	.0	48	31	4,423	−1.0	33	30	4,395	−.8	----	31	4,473	2.7	42	31	4,400	−.8	32
550	29	5,036	−7.3	50	31	5,183	−1.2	58	29	5,131	−3.7	47	31	5,113	−5.1	----	30	5,083	−5.5	----	31	5,175	−1.2	34	31	5,093	−5.4	33
500	29	5,769	−12.1	50	30	5,933	−6.9	59	29	5,876	−8.1	43	31	5,854	−9.7	----	30	5,823	−11.0	----	31	5,925	−8.8	----	31	5,830	−10.5	34
450	29	6,577	−17.3	47	30	6,757	−11.9	44	29	6,696	−13.0	----	31	6,667	−15.0	----	30	6,630	−16.9	----	31	6,757	−10.9	----	31	6,641	−16.3	37
400	29	7,440	−23.4	----	29	7,641	−17.1	----	29	7,574	−18.9	----	31	7,545	−21.1	----	30	7,496	−23.8	----	30	7,640	−16.8	----	30	7,510	−22.7	----
350	29	8,403	−30.2	----	29	8,628	−24.1	----	29	8,554	−26.3	----	30	8,510	−28.0	----	30	8,456	−31.3	----	30	8,628	−23.8	----	30	8,475	−30.0	----
300	29	9,482	−38.2	----	28	9,735	−32.2	----	29	9,650	−34.8	----	29	9,593	−36.3	----	30	9,529	−39.8	----	30	9,735	−31.9	----	27	9,553	−38.0	----
250	29	10,712	−47.1	----	27	11,000	−41.4	----	28	10,896	−44.7	----	29	10,832	−45.9	----	29	10,751	−48.5	----	29	10,999	−41.5	----	27	10,786	−46.1	----
200	29	12,160	−55.5	----	26	12,479	−52.4	----	28	12,349	−56.1	----	29	12,285	−55.0	----	29	12,191	−55.8	----	28	12,475	−52.7	----	18	12,247	−52.7	----
175	28	13,008	−57.1	----	22	13,316	−58.9	----	24	13,195	−61.8	----	26	13,129	−59.0	----	24	13,035	−57.2	----	24	13,324	−58.6	----	12	13,134	−55.1	----
150	25	13,980	−57.6	----	7	14,289	−63.9	----	10	14,126	−66.0	----	25	14,084	−62.8	----	20	14,002	−58.6	----	12	14,282	−64.3	----	7	14,098	−58.8	----
125	24	15,123	−59.1	----	----	----	----	----	5	15,224	−68.8	----	8	15,145	−62.4	----	11	15,132	−61.6	----	----	----	----	----	----	----	----	----
100	10	16,503	−59.4	----	----	----	----	----	----	----	----	----	5	16,507	−62.6	----	----	----	----	----	----	----	----	----	----	----	----	----

Standard pressure surface (mb.)	Boise, Idaho (912.1 mb.)				Brownsville, Tex. (1,013.1 mb.)				Buffalo, N. Y. (988.5 mb.)				Caribou, Maine (990.3 mb.)				Charleston, S. C. (1,015.0 mb.)				Ciudad Victoria, Mexico (974.0 mb.)				Columbia, Mo. (988.7 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	31	868	29.2	24	31	6	28.3	77	31	221	18.9	81	31	191	18.8	87	31	13	22.9	91	27	335	30.8	49	31	239	23.4	70
1,000	31	40	(*)	----	31	122	27.3	78	31	121	(*)	----	31	112	(*)	----	31	143	23.8	88	27	97	(*)	----	31	138	(*)	----
950	31	506	(*)	----	31	580	24.2	74	31	564	18.8	66	31	558	18.9	79	31	595	21.9	79	27	558	28.6	50	31	591	23.1	61
900	31	986	29.6	20	31	1,047	22.2	58	31	1,025	16.0	66	31	1,018	16.3	78	31	1,061	19.3	75	27	1,036	24.2	55	31	1,058	19.9	64
850	31	1,491	25.5	19	31	1,543	19.8	49	31	1,509	12.8	67	31	1,503	13.1	77	31	1,551	15.9	76	27	1,533	20.0	61	31	1,548	16.4	64
800	31	2,018	20.9	21	31	2,063	16.8	44	31	2,015	9.5	65	31	2,020	9.8	76	31	2,064	12.5	75	27	2,053	15.8	68	31	2,062	13.6	52
750	31	2,571	16.0	24	31	2,613	13.6	45	31	2,556	6.5	61	31	2,549	6.7	70	31	2,610	9.4	67	27	2,601	11.6	70	31	2,607	10.9	43
700	31	3,150	10.9	29	31	3,187	10.0	42	31	3,111	3.0	59	31	3,108	3.6	67	31	3,174	6.1	63	27	3,173	7.8	67	31	3,176	7.9	39
650	31	3,758	5.6	33	31	3,804	6.3	45	31	3,711	−.6	56	31	3,710	.1	65	31	3,784	2.9	52	27	3,784	4.3	60	30	3,790	4.4	49
600	31	4,410	.1	39	31	4,451	2.1	46	31	4,344	−4.4	55	31	4,344	−3.5	56	31	4,422	−.5	45	27	4,428	.5	56	29	4,432	.3	38
550	31	5,094	−5.4	44	31	5,151	−1.7	41	31	5,027	−8.3	48	31	5,030	−7.3	52	31	5,115	−4.4	38	25	5,122	−3.0	43	29	5,123	−4.0	----
500	31	5,840	−11.2	41	31	5,901	−6.0	37	31	5,759	−12.7	47	30	5,763	−11.6	50	31	5,858	−8.9	----	25	5,872	−7.3	38	28	5,871	−8.4	----
450	31	6,645	−16.8	----	31	6,725	−10.8	32	31	6,565	−17.9	----	30	6,509	−17.0	48	29	6,678	−14.2	----	25	6,694	−12.3	30	28	6,686	−13.9	----
400	31	7,513	−23.4	----	30	7,614	−16.8	34	29	7,427	−23.8	----	29	7,437	−22.9	----	27	7,547	−20.2	----	25	7,577	−18.3	----	28	7,566	−20.2	----
350	31	8,475	−30.9	----	30	8,603	−23.7	----	29	8,389	−30.5	----	29	8,403	−29.8	----	27	8,522	−27.2	----	23	8,559	−25.5	----	28	8,542	−27.0	----
300	31	9,550	−39.1	----	30	9,709	−32.3	----	29	9,466	−38.3	----	29	9,483	−37.7	----	26	9,619	−35.4	----	23	9,658	−34.2	----	28	9,635	−34.9	----
250	30	10,775	−47.8	----	29	10,967	−42.4	----	27	10,710	−46.2	----	29	10,716	−46.9	----	25	10,868	−44.8	----	22	10,907	−44.3	----	27	10,880	−44.1	----
200	29	12,222	−54.7	----	25	12,438	−53.7	----	27	12,170	−52.1	----	28	12,170	−55.4	----	21	12,326	−55.2	----	19	12,369	−55.8	----	24	12,339	−53.6	----
175	24	13,081	−55.7	----	20	13,286	−59.0	----	27	13,031	−53.5	----	26	13,010	−56.9	----	17	13,194	−60.5	----	5	13,228	−60.1	----	18	13,193	−57.4	----
150	16	14,056	−56.0	----	9	14,252	−63.8	----	24	14,014	−54.6	----	17	14,001	−57.3	----	8	14,135	−63.2	----	----	----	----	----	11	14,176	−60.9	----
125	5	15,187	−58.1	----	----	----	----	----	18	15,168	−56.1	----	7	15,143	−56.3	----	5	----	----	----	----	----	----	----	5	15,259	−63.9	----
100	----	----	----	----	----	----	----	----	10	16,568	−56.5	----	5	16,594	−57.5	----	----	----	----	----	----	----	----	----	----	----	----	----
80	----	----	----	----	----	----	----	----	6	17,958	−54.5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

See footnotes at end of table.

TABLE 1.—*Mean dynamic height (geopotential) in units of 0.98 dynamic meters, temperature in degrees centigrade, and relative humidity in percent, for standard pressures, as obtained by radiosondes during July 1947*—Continued

Standard pressure surface (mb.)	Dodge City, Kans. (926.4 mb.)				El Paso, Tex. (881.6 mb.)				Ely, Nev. (810.4 mb.)				Fort Worth, Tex. (990.7 mb.)				Glasgow, Mont. (937.9 mb.)				Grand Junction, Colo. (853.2 mb.)				Great Falls, Mont. (887.1 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	31	787	25.1	55	31	1,195	29.9	27	31	1,908	22.7	24	31	211	29.4	48	31	648	26.5	40	31	1,474	27.8	27	31	1,128	23.6	33
1,000	31	105	(*)	----	31	51	(*)	----	31	26	(*)	----	31	128	(*)	----	31	74	(*)	----	31	41	(*)	----	31	63	(*)	----
950	31	567	(*)	----	31	529	(*)	----	31	497	(*)	----	31	591	27.5	47	31	536	(*)	----	31	516	(*)	----	31	526	(*)	----
900	31	1,041	25.0	52	31	1,016	(*)	----	31	982	(*)	----	31	1,061	24.0	52	31	1,011	25.0	36	31	1,002	(*)	----	31	1,005	(*)	----
850	31	1,540	22.1	51	31	1,521	28.4	25	31	1,487	(*)	----	31	1,559	20.1	57	31	1,509	21.2	37	31	1,507	27.8	28	31	1,500	22.2	30
800	31	2,065	19.0	48	31	2,054	24.1	29	31	2,020	24.2	----	31	2,079	16.4	56	31	2,030	17.0	41	31	2,041	24.6	26	31	2,022	18.2	31
750	31	2,620	15.4	48	31	2,617	19.2	35	31	2,580	19.9	----	31	2,629	13.4	42	31	2,580	12.7	44	31	2,603	20.0	29	31	2,576	13.5	36
700	31	3,198	11.4	46	31	3,201	13.9	43	31	3,167	14.5	----	31	3,203	9.8	41	31	3,151	8.3	45	31	3,191	14.8	35	31	3,146	8.9	42
650	31	3,815	7.3	42	31	3,825	8.3	51	31	3,784	8.8	28	31	3,819	5.9	41	31	3,761	4.0	45	31	3,812	9.2	43	31	3,756	3.9	48
600	31	4,466	2.9	40	31	4,475	3.1	52	31	4,441	3.0	35	31	4,466	1.7	44	31	4,404	−.4	37	31	4,468	3.3	51	31	4,399	−1.3	50
550	31	5,165	−2.1	43	30	5,182	−2.1	50	31	5,135	−3.3	45	31	5,167	−2.6	43	31	5,091	−5.4	38	31	5,166	−2.3	58	31	5,086	−6.4	50
500	31	5,914	−7.3	41	30	5,926	−6.9	43	31	5,884	−9.3	47	31	5,912	−7.2	37	31	5,835	−10.7	40	31	5,918	−8.0	56	31	5,824	−11.8	53
450	31	6,735	−12.3	----	30	6,754	−11.9	----	31	6,699	−14.9	----	31	6,740	−12.2	----	31	6,645	−16.4	----	31	6,739	−13.5	46	30	6,624	−17.6	52
400	31	7,619	−18.3	----	30	7,634	−17.4	----	31	7,572	−20.9	----	31	7,618	−18.1	----	31	7,512	−22.7	----	31	7,616	−19.6	48	30	7,496	−23.7	----
350	31	8,602	−25.4	----	30	8,620	−24.5	----	31	8,545	−28.0	----	31	8,601	−25.4	----	30	8,478	−29.7	----	31	8,593	−26.8	----	30	8,456	−31.2	----
300	31	9,701	−33.9	----	28	9,724	−33.0	----	30	9,633	−36.1	----	31	9,701	−33.8	----	29	9,555	−38.0	----	31	9,687	−34.7	----	30	9,529	−39.6	----
250	31	10,952	−43.8	----	27	10,979	−43.1	----	29	10,874	−45.1	----	31	10,953	−43.8	----	29	10,786	−46.8	----	31	10,937	−43.9	----	30	10,751	−48.7	----
200	31	12,413	−55.0	----	27	12,445	−54.4	----	28	12,335	−53.8	----	31	12,414	−55.3	----	27	12,241	−53.4	----	25	12,400	−54.0	----	25	12,206	−55.5	----
175	27	13,260	−60.7	----	21	13,289	−60.5	----	23	13,197	−57.7	----	26	13,260	−61.1	----	25	13,096	−54.9	----	17	13,237	−58.7	----	16	13,064	−56.7	----
150	14	14,208	−65.6	----	13	14,234	−66.0	----	16	14,153	−61.3	----	10	14,214	−66.8	----	20	14,073	−56.0	----	14	14,185	−62.5	----	10	14,037	−56.9	----
125	6	15,309	−68.6	----	----	----	----	----	----	----	----	----	----	----	----	----	14	15,219	−57.5	----	6	15,311	−64.4	----	----	----	----	----
100	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	9	16,608	−58.5	----	----	----	----	----	----	----	----	----

Standard pressure surface (mb.)	Greensboro, N. C. (985.2 mb.)				Hatteras, N. C. (1,016.6 mb.)				Havana, Cuba (1,010.5 mb.)				Honolulu, T. H. (1,016.2 mb.)				Huntington, W. Va. (996.3 mb.)				International Falls, Minn. (973.8 mb.)				Joliet, Ill. (995.0 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	31	273	20.7	82	31	3	23.9	86	31	49	25.3	89	31	3	27.8	59	31	172	19.3	88	31	360	19.6	75	31	178	19.6	78
1,000	31	143	(*)	----	31	147	23.3	82	31	142	25.1	86	31	145	25.3	61	31	140	(*)	----	31	129	(*)	----	31	123	(*)	----
950	31	592	21.2	69	31	599	20.9	75	31	597	22.8	81	31	595	21.7	68	31	586	19.4	75	31	580	20.8	68	31	581	20.4	68
900	31	1,056	18.3	68	31	1,061	18.2	70	31	1,063	20.0	77	31	1,062	18.3	74	31	1,047	16.3	76	31	1,040	17.6	64	31	1,044	17.4	66
850	31	1,544	14.8	71	31	1,549	15.4	69	31	1,555	16.9	76	31	1,550	15.3	74	31	1,532	13.1	74	31	1,526	13.8	67	31	1,530	14.1	67
800	31	2,055	11.0	77	31	2,061	12.4	66	31	2,070	13.7	72	31	2,063	13.5	58	31	2,040	10.1	68	31	2,035	10.6	64	31	2,039	10.8	67
750	31	2,594	7.3	73	31	2,602	9.2	64	31	2,615	10.5	67	31	2,608	11.7	35	31	2,580	7.0	61	31	2,579	7.3	59	31	2,580	7.9	57
700	31	3,156	4.2	61	31	3,169	6.0	61	31	3,184	7.1	64	31	3,179	9.1	30	31	3,139	3.7	58	31	3,134	3.9	52	31	3,141	4.7	49
650	31	3,758	1.1	53	31	3,773	2.7	54	30	3,795	3.5	68	31	3,793	6.4	----	31	3,740	−.1	58	31	3,739	.0	49	31	3,743	1.5	42
600	31	4,396	−2.8	50	31	4,417	−.8	45	26	4,437	−.2	74	31	4,442	3.1	----	30	4,373	−3.7	53	31	4,371	−3.7	45	31	4,382	−2.3	39
550	30	5,082	−6.5	42	31	5,108	−4.6	44	26	5,143	−3.8	67	30	5,145	−1.1	----	29	5,060	−7.4	44	31	5,056	−7.8	43	31	5,067	−6.2	----
500	30	5,821	−10.9	----	31	5,851	−9.3	49	26	5,877	−8.4	64	30	5,896	−6.0	----	29	5,794	−12.2	----	31	5,788	−12.6	39	31	5,807	−11.2	----
450	30	6,631	−16.0	----	30	6,666	−14.5	48	25	6,696	−13.3	60	30	6,722	−11.6	----	29	6,597	−17.7	----	31	6,592	−17.9	----	31	6,611	−16.6	----
400	30	7,502	−22.0	----	30	7,542	−20.4	54	24	7,575	−19.3	59	27	7,606	−17.5	----	29	7,463	−23.9	----	31	7,456	−24.0	----	31	7,484	−22.9	----
350	30	8,469	−29.6	----	29	8,517	−27.2	----	21	8,503	−26.4	----	27	8,591	−24.8	----	29	8,423	−31.3	----	31	8,416	−31.2	----	31	8,449	−29.8	----
300	30	9,549	−37.7	----	29	9,608	−35.6	----	18	9,651	−35.1	----	27	9,694	−33.1	----	29	9,497	−39.3	----	31	9,490	−39.5	----	31	9,530	−38.0	----
250	29	10,785	−46.9	----	29	10,849	−45.5	----	17	10,896	−45.5	----	27	10,951	−42.3	----	29	10,723	−47.5	----	28	10,721	−47.7	----	31	10,762	−46.6	----
200	24	12,226	−55.9	----	28	12,298	−56.0	----	13	12,352	−57.0	----	23	12,424	−53.6	----	28	12,181	−54.0	----	22	12,155	−52.7	----	29	12,209	−53.1	----
175	18	13,066	−58.3	----	21	13,131	−59.3	----	7	13,171	−64.0	----	22	13,271	−59.4	----	27	13,027	−55.7	----	20	13,012	−53.2	----	26	13,059	−54.3	----
150	16	14,036	−61.6	----	16	14,070	−60.3	----	----	----	----	----	18	14,233	−64.5	----	22	14,001	−57.0	----	13	13,985	−53.3	----	24	14,036	−56.1	----
125	8	15,157	−63.9	----	5	15,251	−63.0	----	----	----	----	----	7	15,328	−66.6	----	17	15,134	−59.1	----	8	15,196	−55.0	----	19	15,189	−58.6	----
100	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	9	16,522	−60.4	----	----	----	----	----	7	16,500	−60.6	----

Standard pressure surface (mb.)	Lake Charles, La. (1,015.3 mb.)				Lander, Wyo. (831.5 mb.)				Las Vegas, Nev. (943.1 mb.)				Little Rock, Ark. (1,006.6 mb.)				Mazatlan, Mexico (1,008.1 mb.)				Medford, Oreg. (968.0 mb.)				Merida, Mexico (1,011.2 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	31	5	26.0	82	31	1,696	21.8	40	31	574	36.1	13	31	79	25.7	67	31	14	29.0	75	31	401	24.6	40	29	27	27.5	76
1,000	31	139	26.1	74	31	55	(*)	----	31	35	(*)	----	31	137	26.1	64	31	86	28.1	76	31	115	(*)	----	29	125	26.6	77
950	31	595	23.3	70	31	522	(*)	----	31	506	(*)	----	31	594	25.0	57	31	547	24.7	71	31	571	23.0	43	29	581	23.6	77
900	31	1,061	20.3	67	31	1,002	(*)	----	31	997	32.6	----	31	1,062	21.6	62	31	1,015	22.7	69	31	1,003	19.1	50	29	1,050	20.8	73
850	31	1,553	17.5	60	31	1,503	(*)	----	31	1,506	28.1	----	31	1,556	18.2	65	31	1,512	20.0	71	31	1,521	14.9	58	29	1,543	17.9	71
800	31	2,069	14.7	53	31	2,032	22.2	31	31	2,038	23.3	----	31	2,073	15.2	57	31	2,034	17.2	68	31	2,030	10.5	68	29	2,060	14.7	70
750	31	2,620	11.9	42	31	2,590	17.7	33	31	2,596	18.2	20	31	2,621	12.6	47	31	2,590	14.6	60	31	2,570	6.9	72	29	2,608	11.4	67
700	31	3,187	8.8	38	31	3,172	12.8	37	31	3,180	12.9	25	31	3,194	9.6	39	31	3,164	11.0	58	31	3,129	3.9	60	29	3,177	8.0	64
650	31	3,802	4.9	42	31	3,789	7.6	44	31	3,796	7.4	29	31	3,808	6.1	34	31	3,778	6.4	66	31	3,727	.3	48	29	3,789	4.8	60
600	31	4,445	.9	42	31	4,442	2.0	51	31	4,448	2.0	33	31	4,457	1.9	34	31	4,430	1.6	74	31	4,365	−3.6	39	29	4,434	1.0	61
550	31	5,143	−3.5	43	31	5,136	−3.7	57	31	5,143	−3.1	----	31	5,154	−2.3	----	31	5,128	−3.4	79	31	5,045	−7.7	32	29	5,128	−2.9	63
500	31	5,886	−7.7	34	31	5,883	−9.4	58	31	5,890	−8.4	----	30	5,904	−6.5	----	31	5,875	−8.1	70	31	5,781	−12.7	----	29	5,879	−7.1	52
450	31	6,706	−13.0	33	30	6,694	−15.1	57	31	6,704	−14.2	----	30	6,729	−11.6	----	31	6,701	−12.6	60	31	6,577	−18.6	----	29	6,704	−12.0	46
400	31	7,586	−18.9	31	30	7,570	−21.3	55	31	7,583	−20.6	----	29	7,612	−17.7	----	31	7,578	−17.9	60	31	7,443	−25.2	----	29	7,585	−18.2	49
350	31	8,567	−26.1	----	29	8,542	−28.3	58	31	8,556	−28.3	----	29	8,598	−24.5	----	31	8,562	−25.2	54	31	8,398	−32.5	----	29	8,567	−25.7	----
300	30	9,664	−34.3	----	29	9,628	−36.6	----	31	9,643	−36.5	----	27	9,699	−32.7	----	29	9,662	−33.5	57	31	9,466	−40.7	----	29	9,665	−34.5	----
250	30	10,913	−44.3	----	28	10,868	−45.5	----	31	10,883	−45.3	----	26	10,955	−41.9	----	29	10,918	−43.4	----	31	10,683	−49.4	----	27	10,912	−44.6	----
200	30	12,371	−55.5	----	27	12,322	−54.8	----	29	12,345	−54.3	----	26	12,433	−51.9	----	25	12,384	−55.1	----	30	12,117	−54.9	----	16	12,368	−55.9	----
175	29	13,212	−61.2	----	24	13,172	−57.9	----	26	13,192	−58.9	----	26	13,287	−56.8	----	15	13,233	−61.4	----	30	12,970	−54.6	----	----	----	----	----
150	29	14,156	−66.1	----	16	14,132	−61.2	----	14	14,163	−62.4	----	15	14,260	−62.1	----	5	14,184	−68.2	----	29	13,952	−54.3	----	----	----	----	----
125	13	15,255	−70.5	----	9	15,214	−64.2	----	----	----	----	----	----	----	----	----	----	----	----	----	27	15,113	−55.8	----	----	----	----	----
100	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	22	16,526	−57.2	----	----	----	----	----
80	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	15	17,944	−56.3	----	----	----	----	----

See footnotes at end of table.

TABLE 1.—*Mean dynamic height (geopotential) in units of 0.98 dynamic meters, temperature in degrees centigrade, and relative humidity in percent, for standard pressures, as obtained by radiosondes during July 1947*—Continued

Standard pressure surface (mb.)	Miami, Fla. (1,017.0 mb.)				Nantucket, Mass. (1,015.3 mb.)				Nashville, Tenn. (995.7 mb.)				New Orleans, La. (1,015.8 mb.)				North Platte, Nebr.[1]				Oakland, Calif. (1,015.5 mb.)				Ogden, Utah (864.0 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	31	4	25.1	87	27	14	18.9	95	31	180	22.7	75	31	2	25.7	79					31	6	17.8	72	31	1,355	25.3	34
1,000	31	153	24.7	86	27	144	19.9	88	31	143	(*)		31	141	26.2	73					31	137	16.4	75	31	43	(*)	
950	31	603	22.0	85	27	591	19.4	68	31	594	21.8	65	31	597	24.0	67					31	582	16.9	54	31	541	(*)	
900	31	1,072	19.3	82	27	1,052	16.9	63	31	1,058	18.7	68	31	1,065	20.9	66					31	1,035	18.3	25	31	995	(*)	
850	31	1,562	16.3	79	27	1,537	14.0	59	31	1,545	14.6	68	31	1,557	17.7	50					31	1,523	17.0	22	31	1,499	26.5	24
800	31	2,076	13.3	75	26	2,047	10.7	54	31	2,055	11.8	58	31	2,073	14.5	59					31	2,037	14.9	20	31	2,030	23.0	23
750	31	2,622	10.2	69	26	2,591	7.7	52	31	2,600	9.0	52	31	2,622	11.7	52					31	2,588	11.9		31	2,590	18.1	26
700	31	3,189	7.0	64	26	3,148	4.5	46	31	3,162	5.9	49	31	3,191	8.5	49					31	3,152	8.5		31	3,171	13.0	31
650	31	3,797	3.4	66	26	3,753	1.4	38	31	3,766	2.5	49	31	3,805	4.9	46					30	3,762	4.9		31	3,786	7.3	36
600	31	4,441	−.3	65	26	4,388	−2.1	37	31	4,408	−1.4	46	31	4,449	1.3	42					30	4,408	.8		31	4,439	1.7	41
550	29	5,137	−4.1	65	26	5,073	−5.9	35	31	5,095	−5.7	44	30	5,148	−2.6	34					30	5,102	−3.8		30	5,135	−4.2	46
500	29	5,883	−8.4	65	26	5,815	−10.3	41	31	5,836	−10.1	38	30	5,894	−6.8						30	5,846	−9.0		30	5,878	−10.2	53
450	29	6,702	−13.3	67	25	6,624	−15.4		31	6,650	−15.2		30	6,717	−12.0						30	6,661	−14.8		30	6,692	−16.0	49
400	28	7,581	−19.0	65	24	7,502	−21.2		31	7,522	−21.0		30	7,601	−18.2						30	7,535	−21.3		30	7,560	−21.8	
350	28	8,562	−25.8		24	8,473	−27.9		31	8,495	−28.0		30	8,584	−25.5						30	8,505	−28.6		30	8,529	−28.6	
300	28	9,660	−34.2		24	9,561	−36.0		31	9,582	−36.2		28	9,682	−33.8						29	9,590	−36.5		30	9,615	−36.7	
250	28	10,910	−44.2		23	10,807	−45.1		31	10,824	−45.1		26	10,936	−43.6						29	10,831	−44.9		30	10,853	−45.6	
200	27	12,369	−55.9		22	12,269	−54.6		31	12,287	−53.6		24	12,395	−54.9						23	12,310	−52.5		30	12,310	−54.4	
175	24	13,207	−62.1		20	13,116	−57.8		30	13,141	−57.2		22	13,246	−60.3						12	13,182	−54.2		26	13,159	−57.6	
150	18	14,146	−66.8		17	14,094	−58.4		26	14,111	−60.4		6	14,162	−65.8						8	14,170	−56.7		13	14,120	−60.4	
125	7	15,246	−69.6		9	15,236	−58.2		16	15,219	−62.1														5	15,282	−64.6	
100									9	16,594	−62.8																	

Standard pressure surface (mb.)	Oklahoma City, Okla. (970.3 mb.)				Omaha, Nebr. (979.9 mb.)				Phoenix, Ariz. (968.8 mb.)				Pittsburgh, Pa. (972.1 mb.)				Portland, Maine (1,011.9 mb.)				Rapid City, S. Dak. (904.2 mb.)				St. Paul, Minn. (977.8 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	31	391	25.6	69	31	308	25.0	64	31	339	36.9	21	29	382	19.5	76	31	20	18.9	90	31	960	21.6	67	31	317	20.9	71
1,000	31	122	(*)		31	129	(*)		31	49	(*)		29	136	(*)		31	122	20.0	87	31	91	(*)		31	120	(*)	
950	31	575	26.0	61	31	584	24.1	56	31	520	37.3	19	29	588	19.1	73	31	571	19.9	76	31	550	(*)		31	575	21.4	60
900	31	1,054	24.1	57	31	1,051	21.0	57	31	1,009	33.2	20	29	1,044	16.0	74	31	1,031	17.2	72	31	1,021	22.2	61	31	1,034	18.3	61
850	31	1,552	21.0	56	31	1,544	17.8	63	31	1,520	28.7	23	29	1,528	12.8	75	31	1,518	14.0	70	31	1,519	21.6	52	31	1,521	14.9	63
800	31	2,074	18.1	51	31	2,060	14.8	56	31	2,054	23.9	26	29	2,034	9.5	70	31	2,027	10.8	67	31	2,042	17.8	54	31	2,032	11.7	58
750	31	2,625	14.6	46	31	2,607	11.9	44	31	2,616	18.9	31	29	2,578	6.5	59	31	2,566	7.4	65	31	2,596	14.2	53	30	2,575	9.0	44
700	31	3,203	10.9	46	31	3,179	9.0	33	31	3,200	13.7	38	29	3,130	3.4	56	31	3,127	4.4	61	31	3,171	10.2	46	30	3,138	6.2	36
650	31	3,820	6.7	45	31	3,790	5.3	33	31	3,825	8.5	43	28	3,735	−.1	52	31	3,730	1.0	58	31	3,784	5.6	46	29	3,744	2.6	35
600	31	4,470	2.5	44	31	4,437	.9	36	31	4,475	3.2	47	27	4,367	−3.6	40	30	4,366	−2.4	56	31	4,431	.5	45	29	4,387	−1.2	32
550	29	5,168	−1.8	41	31	5,130	−3.8		30	5,179	−2.3	50	27	5,052	−7.5		30	5,052	−6.3	55	31	5,122	−4.4	44	27	5,073	−5.6	
500	29	5,921	−6.3	40	31	5,877	−8.8		30	5,924	−7.2	46	27	5,785	−12.4		30	5,792	−10.4	46	31	5,868	−10.0	48	26	5,819	−10.4	
450	29	6,744	−11.4		30	6,692	−14.1		30	6,750	−12.4		27	6,589	−17.9		29	6,603	−15.5	48	30	6,681	−15.4	44	26	6,628	−15.6	
400	29	7,632	−17.5		30	7,568	−20.3		30	7,628	−18.4		27	7,454	−23.9		29	7,477	−21.1		30	7,554	−21.5		25	7,501	−21.8	
350	28	8,615	−24.6		29	8,547	−27.2		29	8,611	−25.6		27	8,415	−30.8		29	8,449	−28.2		29	8,522	−28.7		24	8,473	−28.7	
300	28	9,718	−32.8		28	9,633	−35.2		29	9,710	−34.0		26	9,488	−38.9		29	9,535	−36.5		29	9,608	−36.8		24	9,558	−36.8	
250	28	10,977	−42.2		28	10,879	−44.3		29	10,962	−43.7		26	10,714	−47.5		29	10,773	−46.1		29	10,847	−45.7		24	10,797	−44.9	
200	23	12,448	−53.1		27	12,351	−54.0		23	12,421	−54.8		25	12,162	−53.7		28	12,217	−56.1		25	12,314	−53.8		23	12,273	−52.2	
175	14	13,320	−57.3		26	13,195	−58.4		19	13,263	−60.4		21	13,014	−54.7		28	13,061	−58.2		16	13,164	−57.0		15	13,139	−54.3	
150	8	14,266	−61.3		23	14,153	−61.7		8	14,186	−66.6		18	13,998	−56.6		28	14,030	−58.6		5	14,110	−60.6		12	14,119	−56.4	
125					15	15,274	−65.2						16	15,139	−58.4		22	15,169	−58.5						5	15,201	−57.2	
100													13	16,531	−57.5		12	16,567	−58.8									

Standard pressure surface (mb.)	San Antonio, Tex. (986.9 mb.)				San Juan, P. R. (1,016.1 mb.)				Santa Maria, Calif. (1,006.5 mb.)				Sault Ste. Marie, Mich. (988.0 mb.)				Spokane, Wash. (943.6 mb.)				Swan Island, W. I. (1,013.1 mb.)				Tacubaya, Mexico (775.5 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	27	240	29.0	59	31	15	26.8	79	30	71	16.4	75	31	221	16.5	80	31	598	26.7	29	29	10	26.9	82	30	2,306	16.4	68
1,000	27	121	(*)		31	157	25.3	81	30	126	15.4	76	31	118	(*)		31	82	(*)		29	125	26.1	82	30	75	(*)	
950	27	580	27.7	58	31	610	21.3	85	30	575	18.1	52	31	565	18.2	65	31	543	(*)		29	580	23.0	84	30	538	(*)	
900	27	1,057	24.1	63	31	1,075	18.3	84	30	1,028	21.3	26	31	1,021	16.5	65	31	1,012	23.3	30	29	1,047	20.1	79	30	1,017	(*)	
850	27	1,554	20.4	67	31	1,564	15.7	73	30	1,521	20.0	24	31	1,506	13.3	68	31	1,507	18.8	35	29	1,539	17.5	69	30	1,511	(*)	
800	27	2,076	16.5	67	31	2,078	14.0	54	30	2,040	16.7	28	31	2,013	10.0	65	31	2,023	14.2	39	29	2,056	15.0	58	30	2,041	(*)	
750	27	2,623	13.2	58	31	2,622	11.2	39	30	2,592	13.2	24	31	2,554	6.6	63	31	2,572	9.4	47	29	2,603	11.8	54	30	2,591	14.0	70
700	27	3,201	10.2	50	31	3,193	7.8	33	30	3,161	9.7		31	3,111	3.4	58	31	3,132	5.4	43	29	3,174	8.3	53	30	3,168	9.5	74
650	25	3,815	6.7	43	31	3,805	3.8	35	30	3,776	6.2		30	3,715	.0	56	31	3,735	1.4	42	29	3,787	4.6	52	30	3,783	5.1	85
600	25	4,466	2.7	36	31	4,445	−.3	33	29	4,421	2.2		30	4,348	−4.0	54	31	4,373	−3.0	43	29	4,431	.5	54	30	4,430	.7	90
550	24	5,168	−1.0	37	30	5,134	−4.1		29	5,118	−2.7		29	5,031	−7.9	45	31	5,055	−7.6	41	29	5,127	−3.7	53	29	5,129	−3.4	87
500	24	5,919	−5.5		30	5,881	−8.2		28	5,865	−8.1		28	5,763	−12.6	41	31	5,790	−12.8	39	29	5,872	−7.9	50	29	5,874	−7.3	69
450	24	6,748	−10.9		30	6,700	−13.2		28	6,686	−14.0		28	6,568	−18.2		31	6,591	−18.3		29	6,691	−12.6	52	29	6,699	−11.9	56
400	23	7,633	−16.9		30	7,579	−19.3		28	7,558	−20.3		27	7,429	−24.5		31	7,455	−24.5		29	7,573	−18.1	49	29	7,581	−18.0	53
350	22	8,622	−23.8		30	8,558	−26.3		26	8,534	−27.8		24	8,381	−31.7		30	8,410	−31.9		28	8,557	−25.0		28	8,564	−25.4	
300	22	9,729	−32.0		30	9,653	−34.9		26	9,624	−35.9		22	9,454	−39.2		30	9,480	−40.2		28	9,658	−33.7		27	9,661	−33.9	
250	22	10,990	−41.8		28	10,899	−44.8		25	10,869	−44.2		12	10,680	−46.2		30	10,699	−49.0		28	10,910	−44.0		19	10,919	−43.9	
200	22	12,466	−52.9		27	12,352	−56.2		19	12,362	−51.9						20	12,142	−54.1		28	12,367	−56.3					
175	21	13,310	−58.7		23	13,190	−62.1		14	13,207	−55.5						26	12,987	−52.7		24	13,200	−63.3					
150	8	14,276	−63.1		15	14,130	−67.2		9	14,183	−59.5						24	13,985	−52.8		14	14,135	−70.3					
125					10	15,233	−70.5										19	15,147	−53.7									
100																	12	16,566	−54.2									
80																	5	18,005	−53.3									

See footnotes at end of table.

TABLE 1.—*Mean dynamic height (geopotential) in units of 0.98 dynamic meters, temperature in degrees centigrade, and relative humidity in percent, for standard pressures, as obtained by radiosondes during July 1947*—Continued

Standard pressure surface (mb.)	Tampa, Fla. (1,016.4 mb.)				Tatoosh Island, Wash. (1,014.1 mb.)				Toledo, Ohio (992.6 mb.)				Washington, D. C. (1,013.2 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	31	9	24.7	85	31	31	14.4	88	31	191	19.7	77	31	25	22.9	77
1,000	31	152	24.9	82	31	149	13.7	86	31	126	(*)	----	31	139	23.1	69
950	31	605	22.6	76	31	583	11.5	79	31	572	19.6	66	31	588	20.7	66
900	31	1,072	19.9	73	31	1,032	9.7	70	31	1,034	16.5	68	31	1,051	17.3	69
850	31	1,563	16.9	71	21	1,505	7.4	67	31	1,518	13.0	71	31	1,537	13.9	69
800	31	2,078	13.6	71	31	2,002	4.6	67	31	2,026	9.6	70	31	2,046	10.4	69
750	31	2,623	10.5	68	31	2,530	1.8	65	31	2,564	6.5	65	31	2,585	7.1	65
700	31	3,192	7.2	64	31	3,079	−1.2	62	31	3,122	3.3	59	31	3,146	3.9	63
650	31	3,801	3.5	63	31	3,669	−4.2	51	31	3,725	.2	50	31	3,745	.5	58
600	31	4,444	.0	55	31	4,294	−8.0	51	31	4,358	−3.6	48	31	4,384	−3.0	51
550	31	5,138	−3.9	56	31	4,966	−12.1	44	31	5,042	−7.9	44	31	5,066	−7.0	46
500	31	5,884	−8.0	54	31	5,687	−16.8	46	31	5,775	−12.4	----	30	5,806	−11.6	41
450	29	6,704	−12.7	55	31	6,477	−22.2	----	31	6,580	−17.8	----	30	6,612	−16.9	38
400	29	7,587	−18.4	56	31	7,327	−27.8	----	31	7,443	−24.2	----	30	7,481	−23.1	----
350	29	8,569	−25.3	----	30	8,277	−34.4	----	31	8,402	−31.6	----	29	8,445	−30.4	----
300	29	9,669	−33.6	----	30	9,338	−41.8	----	30	9,467	−39.8	----	29	9,522	−38.7	----
250	29	10,919	−43.9	----	28	10,562	−47.9	----	30	10,693	−47.0	----	29	10,748	−48.3	----
200	28	12,377	−55.8	----	28	12,092	−50.0	----	27	12,145	−52.6	----	28	12,185	−56.8	----
175	24	13,210	−61.6	----	24	12,910	−49.1	----	19	12,994	−53.2	----	23	13,023	−58.8	----
150	20	14,149	−66.2	----	16	13,908	−48.8	----	14	13,964	−54.1	----	18	13,985	−59.8	----
125	9	15,230	−69.1	----	9	15,114	−49.0	----	8	15,120	−56.2	----	13	15,107	−61.6	----
100	----	----	----	----	----	----	----	----	----	----	----	----	6	16,483	−60.4	----

[1] Data not yet received.

(*) Temperature and relative humidity data for this level are not available or are available only for certain days. See note entitled "Change in Summarization of Radiosonde Data," p. 6, in the January 1946 issue of the MONTHLY WEATHER REVIEW.

NOTE.—All observations scheduled between 0300 and 0500, G. C. T. except at Ciudad Victoria, Mazatlan, and Merida, where they are taken near 0200, G. C. T.

"Number of observations" refers to those of dynamic height only. (In a few cases temperature or humidity data may be missing for one or more standard pressure surfaces of some observations.) Relative humidity data are not published for standard pressure surfaces having a corresponding mean temperature below −20° C.

All relative humidity observations are obtained by electric hygrometer and have been adjusted to compensate for the values occurring below the operating range of the humidity element. For explanation of the adjustment see article entitled "Curve Method for Obtaining Monthly Means of Relative Humidity," p. 241, MONTHLY WEATHER REVIEW, December 1944.

None of the means included in these tables are based on less than 15 observations at the surface or 5 observations at a standard pressure level.

TABLE 2.—*Free-air resultant winds based on pilot-balloon observations made near 5 p. m., E. S. T. (2200 G. C. T.), during July 1947. Directions given in degrees from north (N=360°, E=90°, S=180°, W=270°). Velocities in meters per second*

Altitude (meters) m. s. l.	Abilene, Tex. (534 m.)			Albuquerque, N. Mex. (1,603 m.)			Atlanta, Ga. (299 m.)			Billings, Mont. (1,095 m.)			Bismarck, N. Dak. (512 m.)			Boise, Idaho (868 m.)			Brownsville, Tex. (7 m.)			Buffalo, N. Y. (220 m.)			Burlington, Vt. (100 m.)			Charleston, S. C. (16 m.)			Cincinnati, Ohio (276 m.)			Denver, Colo. (1,618 m.)			El Paso, Tex. (1,198 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observation	Direction	Velocity
Surface	31	127	3.3	31	241	2.9	31	287	1.8	31	98	1.2	31	240	1.8	31	322	4.0	31	116	6.1	30	234	3.9	28	203	1.5	30	169	2.1	31	267	1.9	31	25	1.1	31	125	2.1
500							31	296	2.2										31	117	7.2	30	251	4.9	28	219	4.0	30	173	3.6	31	278	2.1						
1,000	31	135	4.1				31	299	3.0				31	248	2.0	31	322	4.0	31	126	5.9	30	258	6.1	28	234	4.6	28	209	2.5	31	293	3.0						
1,500	31	138	4.0				31	312	3.1	31	107	2.3	31	249	3.0	31	316	2.8	30	128	3.8	26	262	6.9	26	244	5.0	28	253	1.9	30	299	4.1				31	130	2.9
2,000	31	143	4.0	31	242	3.0	30	310	3.3	31	127	2.7	29	258	4.4	31	262	1.8	28	120	2.1	22	267	7.0	25	255	6.2	22	307	1.7	27	304	5.6	31	46	2.4	31	129	3.3
2,500	30	147	3.3	31	227	2.2	29	313	3.6	31	169	2.7	26	272	6.0	31	222	3.1	26	111	2.6	16	265	6.6	20	254	6.0	19	283	3.3	24	307	5.4	31	62	1.8	31	120	3.2
3,000	28	139	2.7	31	189	1.9	25	317	3.9	31	216	3.2	26	285	6.7	31	224	6.1	24	98	2.5	16	276	6.7	17	260	6.9	18	277	4.1	19	305	5.2	31	72	1.5	31	112	4.0
4,000	24	103	.7	31	160	2.7	20	311	6.1	31	253	6.7	25	292	10.0	31	215	10.5	24	102	3.3	11	279	7.4	15	257	5.8	16	271	4.9	13	314	6.9	28	286	2.0	29	109	4.7
5,000	24	28	2.0	31	162	2.2	13	314	5.9	30	264	10.4	23	295	11.6	30	216	13.6	23	91	3.0							10	287	4.3							26	287	5.3	29	105	3.9
6,000	21	20	4.1	31	186	1.8	11	305	7.7	29	260	13.7	22	293	14.8	27	219	15.5	20	73	3.8															25	283	7.3	28	100	2.9
8,000	16	6	4.4	28	202	4.1				25	262	17.8	18	287	17.7	19	218	19.6	12	59	3.8															20	273	11.0	24	129	4.0
10,000	12	4	4.9	25	226	5.8				18	250	20.9	13	293	21.9				11	89	3.4															10	277	15.1	22	147	3.3
12,000	11	24	5.3	21	220	8.5				10	260	25.9																										17	174	3.7
14,000				16	206	7.8																																13	249	3.8

Altitude (meters) m. s. l.	Ely, Nev. (1,910 m.)			Grand Junction, Colo. (1,475 m.)			Greensboro, N. C. (271 m.)			Havre, Mont. (767 m.)			Jacksonville, Fla. (16 m.)			Joliet, Ill. (178 m.)			Las Vegas, Nev. (575 m.)			Little Rock, Ark. (88 m.)			Medford, Oreg. (416 m.)			Miami, Fla. (12 m.)			Mobile, Ala. (66 m.)			Nashville, Tenn. (194 m.)			New York, N. Y. (15 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity
Surface	31	209	6.4	31	277	2.3	31	215	0.9	31	256	0.7	29	126	1.7	31	325	1.6	31	186	3.0	31	130	0.4	30	316	3.8	31	137	2.1	31	18	0.4	30	313	1.1	31	184	4.3
500							31	218	1.7				29	145	1.5	31	322	2.5				31	88	.6	30	315	4.0	31	135	3.6	31	197	.4	30	320	2.9	31	211	5.6
1,000							31	241	2.3	31	236	.8	29	234	1.2	30	312	2.8	31	187	5.7	31	360	.5	30	318	4.3	30	148	3.2	30	8	1.2	30	308	3.6	26	232	5.8
1,500				31	276	2.4	31	261	2.9	31	214	1.6	28	286	2.2	27	312	3.4	31	188	6.5	30	346	1.3	28	301	2.4	30	167	2.6	29	357	2.4	30	304	4.3	25	248	5.5
2,000	31	210	6.7	31	278	3.2	31	266	3.7	31	212	2.5	27	285	3.5	24	316	5.8	31	190	6.7	25	336	3.2	28	226	2.8	28	189	2.4	26	8	3.8	28	306	4.2	25	256	5.9
2,500	31	207	7.4	31	270	2.9	30	279	4.2	30	221	4.0	27	277	4.4	22	325	5.8	31	199	6.8	23	340	5.1	27	204	5.2	27	197	3.4	22	3	4.0	23	295	4.1	23	266	5.4
3,000	31	203	7.1	30	260	2.9	29	282	5.3	30	238	5.8	24	275	4.5	20	330	6.9	31	208	7.0	23	343	6.1	26	196	8.1	27	198	4.6	21	360	4.1	17	296	3.3	20	263	4.9
4,000	31	198	7.5	30	230	4.1	27	284	6.6	26	257	9.1	19	278	6.5	12	342	9.6	31	216	7.8	20	344	7.1	25	210	11.7	22	205	4.6	14	338	6.7	14	323	5.4	13	278	6.3
5,000	31	206	8.4	29	222	6.0	23	281	7.9	25	257	12.0	16	268	6.9				26	216	9.5	18	337	9.3	25	218	4.3	13	202	4.2	10	324	9.3						
6,000	28	218	11.6	26	221	7.1	18	266	8.7	19	265	14.5	12	280	7.6				24	223	8.8	11	327	11.3	24	218	15.9	10	213	2.8									
8,000	23	222	15.2	24	233	10.6	13	262	9.3	14	263	14.6							14	220	9.2				18	224	20.3												
10,000	19	221	26.8	19	236	15.3																																	
12,000	13	232	33.4	13	248	20.2																																	

Altitude (meters) m. s. l.	Oakland, Calif. (8 m.)			Oklahoma City, Okla. (396 m.)			Omaha, Nebr. (306 m.)			Phoenix, Ariz. (338 m.)			Rapid City, S. Dak. (982 m.)			St. Louis, Mo. (181 m.)			St. Cloud, Minn. (318 m.)			San Antonio, Tex. (240 m.)			San Diego, Calif. (13 m.)			Sault Ste. Marie, Mich. (225 m.)			Seattle, Wash. (116 m.)			Spokane, Wash. (603 m.)			Washington, D. C. (24 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity
Surface	31	262	6.6	31	158	4.0	31	161	1.9	31	284	1.3	31	141	1.9	31	288	2.2	30	257	1.9	31	134	3.4	31	270	3.1	29	289	2.8	31	238	2.9	31	206	1.8	31	202	3.1
500	31	273	6.4	31	158	4.3	31	167	2.8	31	271	2.5				31	284	3.4	30	249	2.6	31	121	3.8	31	288	4.0	29	284	4.1	31	230	3.3				31	210	4.2
1,000	31	276	5.6	31	170	4.4	31	186	3.0	31	261	3.1	31	142	2.0	31	294	3.5	30	249	3.1	31	117	4.0	31	294	3.5	28	291	4.5	31	216	4.2	31	220	3.5	31	230	4.7
1,500	31	264	5.1	31	197	3.7	31	217	2.9	31	253	3.0	31	164	2.2	31	321	3.7	30	262	3.8	31	120	3.9	31	292	3.0	28	295	4.8	29	207	4.8	31	222	3.9	31	242	5.2
2,000	31	241	4.3	30	231	3.1	29	263	3.8	31	236	2.5	31	196	2.0	30	322	5.6	28	274	4.8	31	116	3.6	31	272	2.8	26	302	5.1	27	203	5.1	31	216	3.7	30	253	5.5
2,500	31	235	4.9	29	265	2.5	29	287	6.3	31	236	2.3	30	213	2.8	30	322	6.8	24	284	5.8	29	98	2.9	31	242	3.6	24	313	5.3	26	202	5.8	31	215	5.1	28	261	5.5
3,000	31	222	5.6	29	276	2.6	26	294	6.7	31	228	2.0	28	252	4.0	30	322	7.8	18	285	4.6	27	100	2.9	30	229	4.5	20	331	5.1	20	203	5.3	30	214	6.9	26	266	5.4
4,000	31	215	7.6	28	301	4.2	25	307	9.4	30	183	1.8	28	280	7.1	26	329	9.6	14	301	6.5	23	92	2.3	30	216	6.1	16	338	7.0	15	209	11.1	29	213	11.8	21	270	7.6
5,000	30	220	9.7	25	327	5.8	23	313	11.1	25	170	3.3	27	289	8.8	22	330	12.3	12	294	8.2	16	84	1.4	29	210	7.5	10	345	9.3	13	210	13.8	23	220	16.5	17	262	8.9
6,000	30	222	11.5	22	330	7.0	22	315	13.4	22	181	3.9	23	283	10.5	17	333	15.0	12	305	11.3	13	77	2.9	28	208	6.9				13	213	16.2	19	220	18.9	13	257	9.0
8,000	26	219	14.2	17	351	7.4	17	316	19.7	17	188	9.0	15	263	12.8	12	322	17.5							19	188	5.0				12	220	20.6	14	219	20.8			
10,000	18	225	15.7				14	313	24.3	12	205	14.1																						11	228	25.1			
12,000										10	215	15.5																										

TABLE 3.—*Maximum free-air wind velocities (m. p. s.) for different sections of the United States based on pilot balloon observations during July 1947*

Section	Surface to 2,500 meters (m. s. l.)					2,501 to 5,000 meters (m. s. l.)					Above 5,000 meters (m. s. l.)				
	Maximum velocity	Direction	Altitude (m.) m. s. l.	Date	Station	Maximum velocity	Direction	Altitude (m.) m. s. l.	Date	Station	Maximum velocity	Direction	Altitude (m.) m. s. l.	Date	Station
Northeast [1]	33.3	ssw.	2,500	22	Boston, Mass.	38.0	ssw.	3,345	22	Boston, Mass.	66.0	sw.	7,582	3	Caribou, Maine.
East-Central [2]	29.6	sw.	1,288	18	Hatteras, N. C.	26.6	sw.	5,000	9	Raleigh, N. C.	58.0	nnw.	13,900	11	Nashville, Tenn.
Southeast [3]	25.2	w.	1,728	16	Birmingham, Ala.	26.6	sw.	5,000	9	Charleston, S. C.	58.0	nw.	14,768	23	Birmingham, Ala.
North-Central [4]	32.6	w.	1,768	30	Green Bay, Wis.	46.0	w.	3,228	30	Duluth, Minn.	68.0	nw.	11,518	2	St. Cloud, Minn.
Central [5]	34.8	wsw.	1,286	30	Omaha, Nebr.	32.0	w.	3,749	14	Columbia, Mo.	63.0	nw.	10,926	21	Omaha, Nebr.
South-Central [6]	29.8	nnw.	2,338	20	Little Rock, Ark.	30.0	nw.	4,763	21	Little Rock, Ark.	72.8	n.	13,399	9	Little Rock, Ark.
Northwest [7]	39.9	nw.	1,143	19	Ellensburg, Wash.	45.8	w.	4,780	29	Glasgow, Mont.	76.0	ssw.	10,903	7	Tatoosh Island, Wash.
West-Central [8]	27.2	sw.	1,873	11	Sheridan, Wyo.	28.9	sw.	4,267	3	Salt Lake City, Utah.	58.0	sw.	13,090	24	Oakland, Calif.
Southwest [9]	28.7	sw.	1,555	3	Las Vegas, Nev.	25.5	ssw.	4,080	9	Las Vegas, Nev.	59.6	sw.	13,166	23	Fresno, Calif.

[1] Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, and northern Ohio.
[2] Delaware, Maryland, Virginia, West Virginia, southern Ohio, Kentucky, eastern Tennessee, and North Carolina.
[3] South Carolina, Georgia, Florida, and Alabama.
[4] Michigan, Wisconsin, Minnesota, North Dakota, and South Dakota.
[5] Indiana, Illinois, Iowa, Nebraska, Kansas, and Missouri.
[6] Mississippi, Arkansas, Louisiana, Oklahoma, Texas (except El Paso), and western Tennessee.
[7] Montana, Idaho, Washington, and Oregon.
[8] Wyoming, Colorado, Utah, northern Nevada, and northern California.
[9] Southern California, southern Nevada, Arizona, New Mexico, and extreme west Texas.

RIVER STAGES AND FLOODS FOR JUNE AND JULY 1947

C. R. JORDAN

Precipitation during July was below normal except in Pennsylvania, New York, New England, Florida, California, Oregon, and Washington. The average precipitation for Iowa for July, as determined from preliminary reports, was 49 percent of normal, as compared to 220 percent for the month of June. Several States from the Mississippi Valley westward had less than 50 percent of their normal precipitation for July. Nevada received only 10 percent of the normal rainfall for that State.

The severe June floods in the lower Missouri and middle Mississippi Rivers continued into July. A crest of 40.3 feet was recorded at St. Louis, Mo., on July 2, the highest stage at St. Louis since 1844. During July destructive flash floods were reported on small ungaged streams in Indiana, Ohio, New York, New England, Pennsylvania, and Virginia. Droughts were reported in the Southwest, particularly in Arizona, Arkansas, New Mexico, and Texas.

JUNE-JULY FLOOD IN THE MIDWEST

During the early morning hours of July 2, 1947, the crest of the most disastrous flood of record passed St. Louis, Mo., with the stage of the Mississippi River at 40.3 feet. This stage at St. Louis has been exceeded only by the great flood of 1844. The crest at St. Louis followed a month of serious floods in the lower Missouri and middle Mississippi River Valleys. Record stages were reached on many streams, including the Des Moines, Raccoon, Platte, and Grand Rivers in Missouri, and at a few stations on the Mississippi and Missouri Rivers. Several crests were reported on many streams during June. Preliminary estimates indicated that damage caused by the floods to crops, roads, bridges, and private property exceeded 100 million dollars. Several lives were lost, and millions of tons of valuable soil were lost from Missouri, Iowa, Kansas, and Nebraska in the form of erosion. The exact loss resulting from the floods will be difficult to evaluate.

A prolonged period of recurring heavy rainfall maintained severe floods in most of the streams of Iowa, Nebraska, northern Kansas, and Missouri during June. Precipitation over most of this area averaged from 2 to 4 times the usual amount received during June. A few stations in Iowa and Missouri reported monthly totals exceeding 20 inches. Lathrop, Mo., had 23.60 inches during June.

Upper Mississippi Basin.—Severe overflow occurred on the Mississippi River from Keokuk, Iowa, to the mouth of the Ohio River. The following report of the flood in the Burlington, Iowa, district was received from Mr. C. O. Tucker, Weather Bureau Office, Burlington, Iowa:

> Moderate to heavy rains over most of Iowa and adjacent portions of Illinois and Missouri during the latter part of May and throughout the greater part of June 1947, produced severe flooding on the Mississippi River and tributaries in this district.
>
> Peak stages were reached twice during the month on the main stem from Keokuk to near Dam 24. Both times all previous high-water records were equalled or exceeded at Gregory Landing, Hannibal, and Louisiana, Mo.; and Quincy, Ill.
>
> A general rising trend set in on the Mississippi on May 28 and continued, with peak stages being reached between June 8 and 10. A falling trend began on the 11th and continued through June 15. Another rise started in the upper reaches of the district on June 16, extending to the lower reaches by June 17. This rise produced second peak stages on June 20 and 21.
>
> The first station to go above flood stage was Louisiana, Mo., on May 26, and it was also the last station to go below bankful on July 14.
>
> This Mississippi flood was the most damaging of record in this district. Stages from Keokuk, Iowa, to Dam No. 24 were above flood continuously from the latter part of May until the second week in July, and during the month of June averaged 6.3 feet above flood stage.
>
> Flood stages were reached twice during the month of June on the Salt and lower Des Moines Rivers while the Fox and Skunk Rivers were above bankful three times during the month. Flooding on the Des Moines River was quite severe. Crests of 25.1 feet were reached at Keosauqua, Iowa, on June 8 and 16. These were the highest stages since the record crest of 27.9 feet on June 1, 1903.

Two or more crests approaching or exceeding previous high stages were reached on the Cedar, Iowa, Skunk, Raccoon, and Des Moines Rivers. At Des Moines, Iowa, the crest was about 1 foot below the highwater of 1903; but at Boone, Iowa, the 1903 flood was exceeded slightly.

The Mississippi River crested at St. Louis, Mo., at 40.26 feet on July 2. This flood exceeded at St. Louis those of 1943 and 1944 by more than a foot and was exceeded only by the flood of 1844, which reached 41.39 feet. It is interesting to note that although the 1947 stage at St. Louis was higher than in 1943 and 1944, the peak discharge was less. At other points between Alton, Ill., and Thebes, Ill., the U. S. Geological Survey reported that discharges were more nearly in order of the crest stages.

The Ohio River remained at moderate stages throughout the flood period, and the flood in the Mississippi flattened off rapidly below the mouth of the Ohio.

Missouri Basin.—Flood stages were reached on the Missouri River from Blair, Nebr., to its confluence with the Mississippi. Flooding was severe in the Nebraska City-St. Joseph area and from Booneville, Mo., downstream. Serious overflow also occurred in many of the tributaries in Nebraska, northern Kansas, and Missouri. Thirteen lives were lost at Cambridge, Nebr., as a result of a flash flood on Medicine Creek.

Serious overflow occurred along the Republican River from Cambridge to its mouth, where crest stages closely approached those of the 1915 flood, the greatest of record up to that time, but were well below those of the 1935 flood, the greatest of record along the Republican River. The following report of the Cambridge, Nebr., disaster was received from Mr. S. D. Flora, Weather Bureau Office, Topeka, Kans.:

> The disaster occurred on the early morning of Sunday, June 22. It was caused by very heavy rains in the basin of Medicine Creek, which empties into the Republican River at Cambridge. The U. S. Geological Survey gage on Medicine Creek at that point registered a crest of 21.0 feet. While the crest of the great 1935 flood is not known definitely at this point, newspaper accounts state that this flood exceeded that of 1935 at Cambridge by 6 to 8 inches.
>
> The flood arrived suddenly and without warning at about 5 a. m., on the morning of June 22 and was reported to have been a "wall of water" nearly 8 feet high. It reached its crest within 2 hours from the time it was first felt.
>
> Many residents were caught in their houses and in some instances it was necessary to cut holes in roofs in order to escape. Thirteen persons were reported killed. Preliminary reports of the Red Cross showed 30 homes and 10 trailer houses completely destroyed; 40 houses received major damage and 30, minor damage; 65 other buildings were destroyed and 70 damaged. A total of 250 homes was affected. Also, according to the same source, 196 persons were safely rescued and 175 persons received first aid or medical treatment.
>
> Three fourths of the town was covered with water. Miles of railway track in the vicinity were washed out. In the flooded section, mud up to two feet deep covered streets after the water receded.
>
> Property damage in the town was estimated at a million dollars and it was estimated that it would cost $40,000 and require at least 40 days to clean up the debris and silt.

Severe overflow also occurred along the Big and Little Blue Rivers, but the stages reached were generally not record-breaking. At Beatrice, Nebr., a crest of 27.65 feet on the 23d was the highest of record, with the possible exception of 1903. Light to moderate overflow occurred in sections of the Kansas River and the Solomon and Osage Rivers.

The Platte River at Agency, Mo., exceeded the previous

highest stage of record at that station by more than 5 feet. The Grand River in Missouri experienced several crests during the month, two of which exceeded previous maximum stages.

The main stem of the Missouri exceeded flood stage at and below Blair, Nebr. A new all-time record high was set at Nebraska City, Nebr., with a crest of 20.1 feet, reached July 1 and 2, exceeding the previous record of 19.9 feet set in 1943. A near-record stage was reached at Lexington, Mo., but the flood was only moderate at Kansas City. Below Kansas City flooding was severe. Previous maximum stages of record were exceeded at Waverly and Boonville, Mo., and near-record stages were reached at Hermann and St. Charles, Mo.

FLOOD STAGE REPORT FOR JUNE AND JULY 1947

[Table includes flood data for months of June and July, since June data were incomplete at the time that the June issue of the REVIEW was published. All dates are June unless otherwise specified]

River and station	Flood stage	Above flood stages—dates		Crest [1]	
		From—	To—	Stage	Date
ST. LAWRENCE DRAINAGE					
Lake Erie					
St. Marys: Decatur, Ind.	*Feet* 13	1	5	*Feet* 18.2	3
		6	10	16.1	8
St. Joseph: Montpelier, Ohio	10	3	4	10.4	3
Maumee: Fort Wayne, Ind.	15	3	5	17.0	4
Sandusky:					
Upper Sandusky, Ohio	13	3	3	14.5	3
		7	8	15.6	8
Tiffin, Ohio	7	8	8	7.1	8
ATLANTIC SLOPE DRAINAGE					
Connecticut:					
South Newbury, Vt.	22	3	6	28.0	4
White River Junction, Vt.	18	3	6	23.0	4
Lehigh: Lehighton, Pa.	9	8	8	11.2	8
		17	17	9.2	17
Chenango: Sherburne, N. Y.	8	3	3	8.7	3
Chemung:					
Elmira, N. Y.	12	3	4	12.8	3
Chemung, N. Y.	12	3	4	16.1	3
James: Columbia, Va.	10	15	15	11.0	15
Saluda: Pelzer, S. C.	6	14	16	7.5	15
Broad:					
Gaffney, S. C.	10	15	15	11.0	15
Blairs, S. C.	14	16	16	15.5	16
Catawba: Catawba, N. C.	8	14	16	10.2	14
EAST GULF OF MEXICO DRAINAGE					
Apalachicola: Blountstown, Fla.	15	May 25	4	16.4	1
		25	29	16.0	27
Choctawhatchee: Caryville, Fla.	12	1	2	12.0	1-2
MISSISSIPPI SYSTEM					
Upper Mississippi Basin					
Whitewater: Beaver, Minn.	7	July 27	July 27	8.6	July 27
Rock: Moline, Ill.	10	2	9	10.8	4-5
Cedar:					
Waterloo, Iowa	12	13	16	18.7	13-14
Cedar Rapids, Iowa	13	3	3	13.1	3
		5	6	13.3	6
		14	17	18.3	15-16
Iowa: Wapello, Iowa	10	4	July 5	16.5	9
				16.9	17
				12.0	25
Skunk: Augusta, Iowa	15	6	16	19.5	9
				18.4	14
		18	26	18.6	20
		30	July 3	18.9	July 2
Boone: Webster City, Iowa	10	22	26	12.5	25
Raccoon: Van Meter, Iowa	13	2	7	19.3	5
		12	18	21.8	12
		19	19	13.0	19
		22	29	16.0	23
				21.4	25
Des Moines:					
Des Moines, Iowa	23	25	28	26.5	26
		May 29	May 31	14.8	May 30
Tracy, Iowa	14	2	10	25.8	6
				26.4	14
		13	July 9	20.7	23
				20.2	25
				21.5	27
				18.4	May 31
				27.8	7
Eddyville, Iowa	15	May 29	July 9	28.1	15
				22.3	23-24
				23.1	28
		May 29	12	11.4	May 31
				20.4	7
Ottumwa, Iowa	9			20.0	15
		13	July 9	16.2	24
				16.6	28
Keosauqua, Iowa	20	7	9	25.1	8
		15	17	25.1	16

FLOOD STAGE REPORT FOR JUNE AND JULY 1947—Continued

River and station	Flood stage	Above flood stages—dates		Crest [1]	
		From—	To—	Stage	Date
MISSISSIPPI SYSTEM—continued					
Upper Mississippi Basin—Continued	*Feet*			*Feet*	
Fox: Wayland, Mo.	15	5	8	19.1	7
		14	14	17.2	14
		20	20	15.1	20
Salt: New London, Mo.	19	8	11	22.7	10
		19	23	22.96	21
Illinois:					
Morris, Ill.	13	2	4	14.8	3
		8	9	13.2	8
Peru, Ill.	17	1	6	18.7	3
		7	13	18.97	9
Peoria, Ill.	18	7	16	19.4	12
				18.7	13-14
Havana, Ill.	14	May 28	July 9	17.9	19
				15.6	July 3
				21.4	14
Beardstown, Ill.	14	May 27	July 12	20.7	20
				19.1	July 2-3
Meramec:					
Pacific, Mo.	11	July 1	July 3	13.0	July 3
Valley Park, Mo.	14	27	July 8	15.3	28
				20.3	July 2
Mississippi:					
Gordon's Ferry, Iowa	13	13	17	14.2	14
Muscatine, Iowa	15	16	21	16.1	18
				16.0	20
Keithsburg, Ill.	12	5	12	13.2	10
		16	26	15.3	20
Burlington, Iowa	15	8	11	15.5	9
		18	24	17.1	20
				20.2	8
				20.0	9
Keokuk, Iowa	12	1	July 10	19.0	17
				20.2	20
				16.4	29
				17.3	July 1
				15.3	2
Quincy, Ill.	14	May 30	July 11	23.9	10
				23.5	20
				20.2	July 2
				16.1	2
Hannibal, Mo.	13	May 27	July 18	24.1	9
				23.8	21
				20.5	July 2
				15.0	2-3
Louisiana, Mo.	12	May 23	July 14	21.9	9
				22.3	21
				18.7	July 3
Grafton, Ill.	18	5	July 14	26.6	13, 14
				27.5	26
				28.65	July 2
St. Louis, Mo.	30	9	July 13	36.6	14
				39.3	30
				40.26	July 2
				34.8	16-17
Chester, Ill.	27	7	July 15	36.5	28
				37.9	July 1
				38.17	July 4
				38.6	17
Cape Girardeau, Mo.	32	8	July 16	40.4	July 1
				41.9	July 5-6
Missouri Basin					
Elkhorn:					
Neligh, Nebr.	10	23	26	12.8	23
Norfolk, Nebr.	10	25	26	11.0	26
Pilger, Nebr.	12	27	28	12.2	27
West Point, Nebr.	12	28	30	12.6	29
Platte:					
Overton, Nebr.	7	Gage destroyed			
Ashland, Nebr.	7	25	25	7.3	25
		6	10	26.5	9
Solomon: Beloit, Kans.	18	12	15	24.2	14
		23	29	24.8	24
		12	14	16.5	13
Little Blue: Hanover, Kans.	14			16.4	14
		22	25	20.2	24
Big Blue:		12	13	17.7	13
Beatrice, Nebr.	16	15	16	16.8	16
		22	26	27.6	23
		6	7	21.9	6
		12	14	27.0	13
Barnston, Nebr.	18	16	17	19.3	16
		18	19	19.8	19
		21	21	19.3	21
		22	27	29.8	23
		6	7	24.6	6
Blue Rapids, Kans.	20	12	16	27.7	14
		20	21	21.8	21
		22	27	33.2	24
		7	7	22.9	7
Randolph, Kans.	22	14	15	23.8	14
		21	21	24.1	21
		24	26	27.0	25
Republican:					
Bloomington, Nebr.	8	22	24	15.1	23
Guide Rock, Nebr.	10	22	26	18.8	23
Hardy, Nebr.	11	22	26	17.0	24
Scandia, Kans.	10	22	27	15.0	24
Concordia, Kans.	8	22	23	8.8	22-23
		24	26	12.9	25
		7	7	10.1	7
Clay Center, Kans.	15	13	13	16.4	13
		22	29	18.6	23
				22.9	28

See footnote at end of table.

FLOOD STAGE REPORT FOR JUNE AND JULY 1947—Continued

River and station	Flood stage	Above flood stages—dates		Crest [1]	
		From—	To—	Stage	Date
Missouri Basin—Continued	*Feet*			*Feet*	
Republican—Continued					
Wakefield, Kans.	11	23	24	11.2	23
		25	28	15.5	26
Junction City, Kans.	10	26	28	15.8	27
Kansas:					
Ogden, Kans.	18	27	28	20.5	27
Manhattan, Kans.	17	7	8	18.1	7
		14	15	18.1	14
		24	29	20.7	26
				22.4	27
Wamego, Kans.	16	25	28	18.1	26
				17.4	28
Topeka, Kans.	21	26	27	21.9	27
		28	28	21.2	28
Lecompton, Kans.	17	26	28	17.6	27
Lawrence, Kans.	18	27	27	18.1	27
Thompson Fork: Trenton, Mo.	20	5	7	25.4	6
		22	24	21.5	23
Grand:		6	9	33.3	8
Gallatin, Mo.	20	13	15	24.2	15
		19	26	34.5	24
Chillicothe, Mo.	18	1	11	25.5	2
				33.8	7
		12	18	29.4	15
		18	28	33.4	24
		29	July 2	24.0	July 1
				16.9	5
Brunswick, Mo.	12	May 29	July 13	23.8	9
				24.5	26
		July 15	July 16	13.5	July 16
Osage:					
Quenemo, Kans.	27	7	8	32.0	8
Ottawa, Kans.	24	7	9	26.0	8
Osawatomie, Kans.	28	7	10	34.1	9
		23	24	30.7	24
LaCygne, Kans.	25	7	11	29.0	9
		23	26	28.5	25
Trading Post, Kans.	24	8	12	25.9	11
		24	27	25.5	26
Lakeside (Bagnell Dam), Mo.	60	28	July 3	60.3	July 1
		July 7	July 7	60.1	July 7
Big Sioux: Akron, Iowa.	12	13	18	16.5	14
Floyd: James, Iowa.	14	25	26	12.8	26
Missouri:		23	26	17.8	25
Blair, Nebr.	19	28	July 3	20.0	June 30–July 1
Omaha, Nebr.	19	July 1	July 2	19.1	July 2
		4	5	17.1	5
Nebraska City, Nebr.	15	12	20	18.7	13
				19.3	23
		22	July 8	19.4	26, 27, 28
				20.1	July 1
St. Joseph, Mo.	17	6	7	17.5	7
		13	July —	20.4	16
Kansas City, Mo.	22	15	July 5	27.0	25
Lexington, Mo.	22	6	July —	28.2	24
		4	6	18.3	5
Waverly, Mo.	18	6	July 12	22.5	9
				25.1	24
Boonville, Mo.	21	4	July 13	29.4	11
				32.0	27
Jefferson City, Mo.	23	7	July 13	22.9	6
				28.2	12
				32.6	28
Hermann, Mo.	21	5	July 13	22.3	6
				27.1	13
				30.9	29
St. Charles, Mo.	25	5	July 14	32.4	14
				35.3	29
Ohio Basin					
Allegheny: Punxsutawny, Pa.	7	18	18	8.9	18
Middle: Midvale, W. Va.	11	8	8	12.3	8
Tygart: Philippi, W. Va.	17	8	9	17.6	9
Olentangy: Delaware, Ohio.	9	2	3	12.2	2
		8	8	11.0	8
Scioto:					
LaRue, Ohio.	11	2	4	13.8	3
Prospect, Ohio.	10	2	5	13.0	4
Circleville, Ohio.	14	3	6	20.0	4
		15	16	15.0	15
Chillicothe, Ohio.	16	4	6	20.7	5
Piketon, Ohio.	15	4	7	20.8	6
Miami: Middletown, Ohio.	15	2	4	16.8	3
West Fork:					
Edwardsport, Ind.	12	May 30	16	20.9	4
				19.4	11
Anderson, Ind.	10	2	4	11.1	3
Elliston, Ind.	18	2	12	24.0	5
				22.5	10
East Fork:					
Seymour, Ind.	14	2	6	17.9	4
		9	9	14.4	9
Williams, Ind.	10	6	10	13.8	7
White:					
Petersburg, Ind.	16	2	16	21.9	8–9
Hazleton, Ind.	16	2	17	22.9	10–13

See footnote at end of table.

FLOOD STAGE REPORT FOR JUNE AND JULY 1947—Continued

River and station	Flood stage	Above flood stages—dates		Crest [1]	
		From—	To—	Stage	Date
Ohio Basin—Continued	*Feet*			*Feet*	
Wabash:					
Wabash, Ind.	12	2	5	19.6	3
		7	10	17.8	8
Lafayette, Ind.	11	2	11	18.4	4
				17.2	9
Covington, Ind.	16	3	13	21.4	6
				21.0	10
Terre Haute, Ind.	14	5	15	18.9	9
Mt. Carmel, Ill.	17	5	18	21.6	14
Vincennes, Ind.	16	11	18	19.0	14
New Harmony, Ind.	15	9	18	17.0	16
Tennessee: Kentucky Dam, Ky. (Lower Gage)	27	May 26	2	29.7	May 28
		15	22	29.1	18
Ohio:					
Dam No. 50, Fords Ferry, Ky.	34	May 27	May 31	35.3	May 29
Dam No. 53, near Mound City, Ill.	42	April 12	May 8	44.4	May 1
		15	22	44.0	18
		July 5	July 6	42.1	July 6
		8	10	40.0	8, 9, 10
Cairo, Ill.	40	8	10	45.3	19
		11	July 13	43.9	July 6
White Basin					
Black:					
Leeper, Mo.	11	28	28	12.2	28
Poplar Bluff, Mo.	16	29	30	16.3	29
White: Clarendon, Ark.	26	May 29	3	26.0	May 29–31
Arkansas Basin					
Neosho:					
Emporia, Kans.	23	7	7	24.6	7
Burlington, Kans.	27	7	7	27.9	7
LeRoy, Kans.	23	8	8	23.4	8
Iola, Kans.	15	8	9	16.0	8
Deep Fork: Dewar, Okla.	18	2	3	18.7	2
North Canadian:					
Woodward, Okla.	5	27	27	5.5	27
Canton, Okla.	9	28	28	9.8	28
Canadian: Whitefield, Okla.	16	1	2	16.95	1
Fouche La Fave: Perryville, Ark.	20	May 17	May 31	25.0	May 22
		5	5	20.2	5
Arkansas:					
Great Bend, Kans.	8	6	6	8.8	6
Hutchinson, Kans.	6	7	7	6.3	7
Ft. Smith, Ark.	22	2	2	22.3	2
Van Buren, Ark.	22	2	3	23.5	3
Red Basin					
Sulphur: McCartney Bridge, Tex.	22	May 23	1	24.7	May 26
Lower Mississippi Basin					
St. Francis:					
Fisk, Mo.	20	30	July 6	21.6	July 3
St. Francis, Ark.	18	July 5	July 11	18.9	July 8
Mississippi:					
New Madrid, Mo.	34	16	24	35.6	20
		July 5	July 9	34.5	July 7
Caruthersville, Mo.	32	17	25	33.8	20–21
		July 6	July 10	32.6	July 8
Atchafalaya Basin					
Atchafalaya: Atchafalaya, La.	25	April 19	July 9	26.5	May 2–12
				25.6	11–15
WEST GULF OF MEXICO DRAINAGE					
Nespique Bayou: Basile (near), La.	22	23	27	23.6	25
Calcasieu: Kinder, La.	16	22	23	18.97	22
Sabine: Mineola, Tex.	14	26	30	15.5	28
East Fork: Rockwall (near), Tex.	10	21	27	12.1	22
Trinity:					
Dallas, Tex.	28	20	23	36.6	22
Rosser, Tex.	26	22	27	29.1	25
Trinidad, Tex.	28	24	30	31.2	28
Nueces: Cotulla, Tex.	15	27	28	16.4	27
GULF OF CALIFORNIA DRAINAGE					
Colorado Basin					
Eagle: Eagle, Colo.	5	9	9	5.0	9
		21	21	5.1	21
Gunnison: Delta, Colo.	9	May 3	May 13	10.4	May 7
		8	13	9.9	10
		20	24	10.1	22
Animas: Durango, Colo.	4	----	----	5.3	9
Colorado: Grand Junction, Colo.	11	22	22	11.2	22
Columbia Basin					
Willamette: Portland, Oreg.	18	11	15	18.7	13
Columbia:				43.4	May 12
				42.5	May 28
The Dalles, Oreg.	40	May 9	23	42.1	4
				42.4	9
				43.1	11, 13
				42.5	19
				18.7	May 13
				18.0	May 18
Vancouver, Wash.	15	May 10	25	17.5	May 31
				17.4	6
				19.1	13
				17.9	20

[1] Provisional.

CLIMATOLOGICAL DATA FOR JULY 1947

CONDENSED CLIMATOLOGICAL SUMMARY OF TEMPERATURE AND PRECIPITATION BY SECTIONS

[For description of tables and charts, see Review, January 1943, p. 15]

In the following table are given for the various sections of the climatological service of the Weather Bureau the monthly average temperature and total rainfall; the stations reporting the highest and lowest temperatures, with dates of occurrence; the stations reporting the greatest and least total precipitation; and other data as indicated by the several headings.

The mean temperature for each section, the highest and lowest temperatures, the average precipitation, and the greatest and least monthly amounts are found by using all trustworthy records available.

The mean departures from normal temperatures and precipitation are based only on records from stations that have 10 or more years of observations. Of course, the number of such records is smaller than the total number of stations.

Section	Temperature							Precipitation					
			Monthly extremes							Greatest monthly		Least monthly	
	Section average	Departure from the normal	Station	Highest	Date	Station	Lowest	Date	Section average	Departure from the normal	Station	Amount	Station	Amount
	°F.	°F.		°F.			°F.		In.	In.		In.		In.
Alabama	77.7	−2.6	Evergreen	100	15	Valley Head	41	22	3.48	−2.11	Perryville	11.06	Magella	0.68
Arizona	81.6	+1.4	3 stations	117	1	Fort Valley	30	1 11	.96	−1.13	Nogales	3.73	5 stations	.00
Arkansas	78.3	−2.2	do	109	31	Paragould	41	23	1.25	−2.42	Paragould	4.66	Steve	.00
California	70.9	−2.4	Cow Creek	126	19	Boca	26	4	.11	+.03	Crescent City	9.25	255 stations	.00
Colorado	67.9	+.7	Eads	110	30	Pearl	20	1	1.75	−.37	Cripple Creek	6.28	Grand Junction	.09
Florida	79.8	−1.5	3 stations	98	1 1	Raiford	51	7	8.11	+.69	Punta Gorda	18.25	Caryville	2.16
Georgia	77.2	−2.8	Carlton Bridge	100	31	Blairsville	45	24	2.97	−2.74	Talbotton	8.23	Atlanta	.56
Idaho	68.8	+.6	2 stations	107	1 14	Landmark	24	1	.18	−.47	Palisades Dam	1.63	34 stations	.00
Illinois	73.0	−3.4	Quincy	104	30	Paris	41	23	1.88	−1.29	Freeport	6.95	Warsaw	.24
Indiana	71.2	−4.4	3 stations	99	1 30	2 stations	41	1 22	3.12	−.19	Maury	7.96	Angola	.87
Iowa	72.8	−2.2	Hawarden	109	29	Decorah	36	22	1.72	−1.89	Dubuque	6.26	Emmetsburg	.06
Kansas	77.6	−1.6	2 stations	111	30	Tribune	45	1	1.91	−1.19	Oswego	6.35	Blue Rapids	.27
Kentucky	71.6	−5.4	Paducah	102	31	Headquarters	40	23	3.82	−.32	Ravenna	7.69	Lovelaceville	1.01
Louisiana	81.1	−.7	Winnfield	106	29	North Livingston Tower.	50	25	2.02	−4.08	Pecan Island	8.83	Converse	.05
Maryland-Delaware	74.7	−.5	Coleman, Md	97	30	Oakland, Md	37	24	4.11	−.25	Picardy, Md	9.10	Lewes, Del	1.33
Michigan	67.7	−1.5	2 stations	97	1 29	2 stations	31	1 21	2.68	−.03	Grosse Pointe Shores	5.72	Eagle Harbor	.14
Minnesota	70.2	+.2	Marshall	106	29	Grand Marais	31	1	1.83	−1.42	Thief River Falls	7.37	Canby	.13
Mississippi	78.6	−2.5	2 stations	102	1 28	Batesville	47	23	2.21	−2.86	Kosciusko	7.13	Tylertown	.01
Missouri	75.0	−3.0	Birch Tree	108	31	Black (near)	39	23	2.17	−1.33	Lockwood	6.56	Kahoka	.11
Montana	69.1	+1.9	Hysham	111	28	Northeast Entrance	23	1	.81	−.55	Baker	3.14	Crow Agency	.02
Nebraska	74.3	−1.2	9 stations	109	1 28	Harrison	40	1	1.81	−1.25	Stratton	6.83	Bloomfield	.12
Nevada	72.0	−.6	Overton	117	18	5 stations	31	1 1	.03	−.35	Lehman Caves	.31	44 stations	.00
New England	71.2	+2.1	Haverhill, Mass	95	30	Somerset, Vt	38	1 2	4.87	+1.09	Bloomfield, Vt	9.14	Lakeport, N. H	2.14
New Jersey	73.8	−.1	2 stations	96	30	Charlotteburg	44	24	4.27	−.43	Phillipsburg	9.19	Cape May	1.21
New Mexico	74.2	+1.9	Orogrande	108	1 6	Eagle Nest	27	1	1.31	−1.12	Clayton Airport	5.84	4 stations	.00
New York	69.9	+.1	Dansville	96	6	Allegany State Park	39	24	5.90	+1.94	Elizabethtown	11.27	Mineola	2.30
North Carolina	73.9	−3.0	Monroe	101	31	Banners Elk	36	23	4.99	−1.01	Laurinburg	13.79	Pisgah Forest	1.57
North Dakota	70.4	+1.4	2 stations	103	28	Edmore	33	21	1.79	−.62	Grafton	5.26	Colgate	.20
Ohio	69.4	−4.2	Napoleon	98	30	2 stations	41	1 20	3.79	.00	Circleville	10.24	Montpelier	.89
Oklahoma	80.2	−1.6	Alva	112	30	Kenton	45	1	1.99	−.76	North Side Disposal	6.08	Lyons	T
Oregon	64.8	−1.7	Huntington	106	18	Chemult	26	3	1.03	+.61	Brookings	6.40	19 stations	.00
Pennsylvania	69.5	−2.6	Marcus Hook	100	30	2 stations	38	24	6.23	+1.92	Park Place	19.81	Farrell	1.57
South Carolina	76.6	−3.2	Walhalla	104	31	Walhalla	50	9	5.36	−.52	Eutawville	15.17	Walhalla	.44
South Dakota	73.0	−.1	Centerville	112	29	Custer	34	1	1.00	−1.39	Aberdeen	4.09	3 stations	.00
Tennessee	73.7	−4.0	Savannah	101	31	Waynesboro	41	23	3.54	−.92	Palmetto	8.26	Memphis	.63
Texas	83.3	+.3	Henrietta	113	18	Bronson	51	24	.98	−1.60	2 stations	5.26	12 stations	.00
Utah	71.8	.0	Zion National Park	110	19	Enterprise	28	12	.35	−.54	G. B. E. S. Meadows	1.46	7 stations	.00
Virginia	72.4	−2.9	Diamond Springs	100	31	Burkes Garden	34	23	3.93	−.76	Wallaceton (near)	8.67	Wytheville	1.57
Washington	65.8	−.8	Richland	106	17	Paradise R. S	29	4	1.10	+.44	Clearwater	5.50	Quincy #27	T
West Virginia	69.2	−3.9	Hinton	100	31	Cranberry Glades	30	24	4.46	−.15	Salem	9.58	Clay	1.27
Wisconsin	69.2	−.9	River Falls	100	29	Laona	30	22	2.73	−.68	Mauston	6.40	Spooner	.57
Wyoming	67.8	+1.9	Arvada	107	28	Bondurant	21	14	.98	−.33	Pole Mountain Nursery.	4.06	Sage	.02
Alaska (June)	51.1	−1.4	3 stations	84	9	2 stations	19	1 1	1.80	+.07	Whittier	12.53	Point Hope	.00
Hawaii (June)	73.7	+.6	Waianae	94	1 11	Haleakala R. S	43	29	3.77	−.97	Kukui	22.00	16 stations	.00
Puerto Rico	79.1	+1.0	Arecibo	95	1 6	Garzas	54	10	2.97	−3.56	Coloso	8.77	Arecibo	.00

[1] Other dates also.

CLIMATOLOGICAL DATA FOR WEATHER BUREAU STATIONS FOR JULY 1947

District and station	Elevation of instruments: Barometer above sea level	Elevation of instruments: Thermometer above ground	Elevation of instruments: Anemometer above ground	Pressure: Station	Pressure: Sea level	Pressure: Departure from normal	Temperature of the air: Mean	Temperature of the air: Departure from normal	Temperature of the air: Maximum	Temperature of the air: Date	Temperature of the air: Mean maximum	Temperature of the air: Minimum	Temperature of the air: Date	Temperature of the air: Mean minimum	Temperature of the air: Greatest daily range	Total degree days	Mean temperature of the dew point	Mean relative humidity	Precipitation: Total	Precipitation: Departure from normal	Precipitation: Greatest in 24 hours	Precipitation: Days with 0.01 inch or more	Wind: Average hourly velocity	Wind: Prevailing direction	Wind: Maximum velocity: Miles per hour	Wind: Maximum velocity: Direction	Wind: Maximum velocity: Date	Clear days	Partly cloudy days	Cloudy days	Average cloudiness, tenths	Total snowfall	Snow, sleet, and ice on ground at end of month	Number of days with thunderstorms
																														0–10			
NEW ENGLAND	Ft.	Ft.	Ft.	Mb.	Mb.	Mb.	°F	°F	°F		°F	°F		°F	°F		°F	%	In.	In.	In.		Mi.									In.	In.	
							71.0	+2.7										83	4.44	+0.9											6.5			
Eastport	75	67	85	1,011.5	1,014.2	+0.3	61.5	+1.1	79	26	69	49	3	54	25	115	58	92	4.68	+1.6	1.86	8	8.5	s.	25	e.	8	3	9	19	7.8	0.0	0.0	3
Greenville, Maine	1,070	6	41	975.3	1,013.9	−.3	67.8	+2.7	89	10	79	46	4	56	36	14	62	84	6.37	+2.1	2.03	19	3.3	sw.	17	------	31	0	16	15	----	.0	.0	9
Portland, Maine [1]	103	5	43	1,010.2	1,013.9	−.7	70.6	+4.9	89	31	81	52	3	61	29	2	63	83	3.06	−.2	2.23	8	8.2	s.	26	s.	28	3	14	14	6.6	.0	.0	7
Concord [1]	289	4	45	1,003.7	1,014.6	.0	71.8	+4.4	91	1	84	47	5	60	37	0	64	81	3.82	+.3	1.19	14	6.2	se.	21	nw.	27	5	10	16	6.9	.0	.0	15
Burlington [1]	403	6	51	998.3	1,012.9	−.6	72.6	+2.3	91	14	83	49	4	62	31	1	64	79	4.90	+1.4	1.02	15	8.3	s.	28	w.	1	2	19	10	6.5	.0	.0	11
Boston [1]	124	33	62	1,010.1	1,014.5	−.1	74.4	+2.7	90	30	82	59	21	66	22	0	64	74	3.98	+.5	1.54	9	10.8	sw.	32	sw.	28	6	11	14	6.5	.0	.0	4
Nantucket [1]	12	11	59	1,015.2	1,015.9	+1.0	69.8	+2.0	82	30	76	55	4	64	19	4	66	93	2.63	−.2	1.13	9	11.3	sw.	27	se.	22	6	8	17	6.6	.0	.0	3
Block Island	26	11	46	1,014.2	1,015.2	+.3	71.1	+2.7	83	30	77	58	3	65	16	0	67	89	4.73	+1.6	2.36	10	12.3	sw.	24	sw.	18	9	6	16	6.0	.0	.0	2
Providence [2]	159	46	60	1,009.5	1,015.2	+.3	75.5	+2.1	93	30	84	59	24	67	27	0	64	80	4.71	+1.4	2.00	10	8.1	sw.	29	sw.	31	5	12	14	6.3	.0	.0	6
Hartford [1]	159	5	44	1,009.1	1,014.6	.0	73.3	+1.7	91	30	83	54	24	64	31	0	64	77	6.32	+2.0	2.03	12	7.8	s.	22	w.	31	6	11	14	6.5	.0	.0	8
New Haven [1]	107	5	39	1,011.2	1,014.9	−.3	72.5	+3.2	86	14	80	54	24	65	26	0	66	80	3.67	−.3	1.12	11	6.6	sw.	19	s.	17	9	10	12	5.9	.0	.0	6
MIDDLE ATLANTIC																																		
							74.3	−.6										77	4.52	+.2										6.0			
Albany [1]	97	26	40	1,010.2	1,013.5	−.7	72.1	+1.2	92	1	83	50	4	61	34	1	64	77	3.66	+.8	.91	11	7.8	s.	26	se.	16	7	7	17	6.7	.0	.0	11
Binghamton [2]	871	60	79	984.8	1,014.9	−.3	70.5	+.5	91	30	81	48	24	70	32	11	63	84	4.87	+1.2	1.49	23	4.7	w.	22	sw.	15	0	15	16	7.5	.0	.0	17
New York	314	415	454	1,003.7	1,015.2	+.3	74.4	+.6	92	30	82	61	3	67	23	0	64	72	2.72	−1.5	.87	12	12.5	sw.	35	w.	31	6	13	12	6.0	.0	.0	5
Harrisburg [1]	374	30	49	1,002.4	1,014.9	−.3	73.4	−1.4	92	30	83	54	23	63	30	1	62	74	5.46	+1.6	2.03	15	6.7	w.	32	sw.	6	5	9	17	6.7	.0	.0	12
Philadelphia [2]	114	6	56	1,010.8	1,014.9	−.7	76.0	−.2	92	30	84	61	23	68	22	0	66	78	2.49	−1.7	.71	9	7.4	s.	19	sw.	27	11	6	14	5.8	.0	.0	5
Reading	323	47	306	1,003.4	1,014.9	−.3	74.8	−.4	94	30	85	55	24	65	29	0	----	---	6.66	+2.4	3.10	13	8.8	s.	35	nw.	2	9	9	13	6.1	.0	.0	10
Scranton	805	72	104	986.1	1,014.9	−.7	70.8	−.9	90	1	80	50	24	61	29	10	----	---	9.70	+5.7	3.21	20	5.2	sw.	43	nw.	1	3	17	11	6.3	.0	.0	15
Atlantic City	52	37	172	1,013.2	1,014.9	−.3	72.8	+.7	87	31	78	60	24	67	19	0	66	82	1.71	−2.2	.40	12	14.0	s.	31	se.	7	11	5	15	5.9	.0	.0	4
Trenton	190	89	107	1,008.1	1,014.9	.0	75.1	+.6	92	30	84	58	24	66	26	0	----	---	2.05	−1.9	.73	13	8.2	s.	30	s.	17	7	10	14	6.2	.0	.0	9
Baltimore [2]	123	100	215	1,010.8	1,015.2	.0	76.7	−.5	96	30	85	58	23	68	25	0	64	72	4.92	+.3	2.25	14	9.2	sw.	38	se.	17	11	9	11	5.4	.0	.0	11
Washington [2]	112	56	100	1,011.5	1,015.6	+.4	76.2	−.6	95	30	86	56	24	67	29	0	64	70	5.35	+.6	1.81	14	6.3	s.	33	w.	12	10	9	12	5.6	.0	.0	10
Cape Henry	18	8	54	1,015.2	1,015.9	+.3	76.0	−1.5	97	31	84	62	25	69	25	0	68	79	3.01	−2.4	1.22	11	9.3	s.	42	nw.	31	11	8	12	5.5	.0	.0	7
Lynchburg [1]	686	144	184	991.5	1,015.9	−.4	73.3	−2.8	97	31	84	54	23	62	32	0	64	78	4.04	−.2	1.11	11	6.8	sw.	34	n.	31	12	8	11	5.3	.0	.0	10
Norfolk [2]	91	80	125	1,012.9	1,016.3	.0	77.0	−1.7	96	31	85	64	26	69	24	0	66	78	8.28	+2.5	2.72	12	8.5	sw.	22	ne.	3	9	8	14	6.0	.0	.0	8
Richmond [2]	144	11	52	1,009.8	1,014.9	−1.0	75.6	−2.9	95	31	85	57	23	66	25	0	65	76	2.87	−1.9	1.54	11	6.4	sw.	26	s.	31	11	11	9	5.1	.0	.0	7
SOUTH ATLANTIC																																		
							76.9	−2.0										78	5.24	−.5										5.8			
Asheville	2,253	77	92	939.4	1,016.6	.0	70.6	−1.1	91	31	82	50	10	59	31	3	60	76	3.56	−.7	1.83	11	5.3	nw.	24	nw.	15	8	15	8	5.4	.0	.0	7
Charlotte [2]	779	63	86	988.8	1,016.3	.0	76.2	−2.2	98	31	86	58	23	66	26	0	63	73	5.21	+1.2	2.37	13	6.1	s.	24	sw.	6	10	10	11	5.5	.0	.0	14
Greensboro [1]	886	6	56	985.4	1,016.9	+.6	74.6	−2.6	97	31	86	52	24	63	34	0	63	76	3.34	−1.8	.78	10	6.6	sw.	35	n.	31	11	10	10	5.3	.0	.0	13
Hatteras	11	5	50	1,015.9	1,016.3	.0	76.7	−1.5	85	30	81	69	5	73	14	0	72	85	4.57	−.9	1.44	14	12.6	sw.	34	sw.	20	4	7	20	7.4	.0	.0	10
Raleigh [2]	376	27	69	1,002.7	1,016.3	+.4	75.8	−3.0	98	31	86	57	23	65	31	0	66	80	5.80	+.4	3.44	12	6.3	s.	33	s.	14	9	10	12	5.5	.0	.0	7
Wilmington	72	73	107	1,013.9	1,016.3	−.3	76.4	−2.7	91	31	84	64	9	69	21	0	70	83	10.35	+3.2	3.35	19	8.7	sw.	28	s.	19	4	17	10	6.0	.0	.0	19
Charleston [2]	48	11	92	1,014.6	1,016.3	−.3	78.7	−2.7	92	31	85	65	9	72	19	0	70	86	7.89	+1.0	1.94	16	8.9	s.	26	sw.	29	7	12	12	6.1	.0	.0	17
Columbia, S. C. [2]	347	70	91	1,003.7	1,015.9	−.7	78.3	−2.6	98	1	89	62	23	68	28	0	66	74	5.78	+.4	1.95	10	7.2	s.	41	n.	28	12	13	6	4.7	.0	.0	9
Greenville, S. C. [1]	1,040	18	36	979.7	1,015.9	.0	76.3	−.6	98	31	86	58	10	66	28	0	62	68	1.78	−3.6	.83	10	8.1	ne.	34	ne.	24	4	20	7	5.5	.0	.0	11
Augusta [2]	182	62	77	1,009.5	1,015.9	.0	79.6	−1.7	97	31	90	63	9	69	26	0	64	68	2.44	−3.0	1.47	7	5.4	s.	24	s.	15	7	18	6	5.1	.0	.0	11
Savannah [1]	65	73	152	1 014.2	1,016.6	.0	79.6	−1.3	94	31	88	63	5	71	24	0	72	84	4.60	−2.0	1.04	14	8.9	sw.	36	sw.	16	4	14	13	6.6	.0	.0	17
Jacksonville [2]	43	86	110	1,015.2	1,016.9	−.4	80.2	−1.9	93	22	88	66	5	73	21	0	71	80	7.61	+.9	2.92	13	8.5	sw.	25	e.	4	2	15	14	7.0	.0	.0	13
FLORIDA PENINSULA																																		
							81.0	−1.1										81	10.85	+5.3										7.1			
Key West [2]	21	10	64	1,015.2	1,015.9	−1.0	82.9	−.6	91	15	88	71	4	77	17	0	74	77	13.64	+10.4	6.10	18	7.6	e.	24	sw.	8	3	15	13	6.6	.0	.0	14
Miami [2]	25	242	249	1,015.6	1,016.6	−1.0	79.8	−2.0	88	3	85	67	17	74	20	0	74	83	7.80	+2.2	1.80	17	10.5	se.	38	se.	28	0	10	21	7.8	.0	.0	19
Tampa [1]	35	6	43	1,015.6	1,016.6	−.7	80.4	−.8	94	22	88	64	6	72	25	0	72	84	11.10	+3.2	2.75	19	6.9	sw.	34	e.	27	3	15	13	6.8	.0	.0	20
EAST GULF																																		
							78.9	−2.1										72	3.22	−2.6										5.0			
Atlanta [1]	1,173	33	72	982.4	----------	-----	76.2	−1.9	95	31	86	59	22	66	27	0	61	62	1.47	−3.4	.97	6	9.1	w.	35	w.	28	12	15	4	4.7	.0	.0	4
Macon [2]	370	79	87	1,003.1	1,015.9	−.7	77.8	−3.4	96	14	89	58	9	67	29	0	65	71	5.00	+.3	1.71	8	5.5	n.	30	nw.	1	9	12	10	5.4	.0	.0	9
Thomasville	273	49	58	1,007.5	1,017.3	+.4	78.3	−3.5	93	1	88	64	23	68	29	0	---	---	4.52	−2.2	1.10	12	----	------	--	------	--	8	15	8	----	.0	.0	10
Apalachicola	35	11	51	1,014.9	1,016.3	−.3	79.4	−2.3	92	1	86	66	23	72	21	0	71	78	6.37	−1.4	1.60	12	7.2	sw.	26	se.	5	9	12	10	5.6	.0	.0	18
Pensacola [2]	56	54	79	1,014.6	1,016.6	.0	80.5	−.5	96	1	88	64	23	73	26	0	69	73	2.72	−4.0	1.19	5	7.2	w.	31	nw.	17	11	12	8	5.0	.0	.0	8
Birmingham [1]	700	5	62	992.2	1,016.6	0	76.2	−3.5	94	30	88	52	23	65	34	0	62	67	1.41	−3.8	.70	8	6.9	e.	29	n.	28	9	16	6	5.0	.0	.0	4
Mobile [2]	57	86	161	1,014.9	1,016.9	+.6	80.6	−.8	96	15	90	62	23	71	26	0	68	76	1.13	−5.8	.41	7	7.3	n.	31	n.	15	13	12	6	4.6	.0	.0	10
Montgomery [2]	218	92	105	1,008.8	1,016.6	.0	79.1	−2.6	96	1	89	61	23	69	25	0	66	70	4.89	.0	2.54	8	6.3	n.	27	w.	17	12	13	6	4.6	.0	.0	7
Meridian [2]	375	67	92	1,003.7	1,016.9	+1.0	77.3	−3.1	96	29	88	55	23	66	29	0	66	73	2.81	−2.1	.96	8	4.9	n.	20	ne.	29	16	11	4	4.1	.0	.0	7
Vicksburg [2]	247	82	102	1,008.1	1,016.6	+.3	79.5	−1.8	95	29	89	60	23	70	27	0	68	78	1.92	−2.6	.86	5	7.3	n.	21	w.	18	12	10	9	5.1	.0	.0	7
New Orleans	53	76	84	1,014.9	1,016.9	+.6	83.1	+.7	96	17	91	67	23	75	23	0	68	67	3.23	−3.1	2.06	3	6.3	se.	25	n.	29	6	17	8	5.5	.0	.0	5
WEST GULF																																		
							83.1	+.1										68	1.06	−2.1										4.8			
Shreveport [1]	249	5	64	1,007.8	1,016.6	+1.4	82.4	−.8	102	28	94	62	23	70	29	0	65	62	.84	−2.7	.66	3	7.5	se.	45	n.	18	8	15	8	5.3	.0	.0	4
Fort Smith [1]	463	57	82	1,000.0	1,015.9	+1.7	80.2	−1.3	107	31	94	54	23	67	41	0	64	62	.11	−3.3	.08	3	6.0	ne.	19	w.	20	12	11	8	4.9	.0	.0	4
Little Rock [1]	357	5	58	1,004.4	1,016.9	+1.7	79.3	−1.6	103	31	90	56	23	68	31	0	66	68	1.03	−2.5	.87	3	6.6	sw.	29	nw.	29	11	14	6	4.7	.0	.0	3
Austin [1]	605	10	41	994.6	1,015.6	+1.0	84.0	.0	100	17	96	65	20	72	29	0	66	64	2.18	−.2	1.95	4	7.6	s.	26	se.	12	12	13	6	4.6	.0	.0	3
Brownsville [1]	57	5	54	1,012.2	1,013.9	.0	85.5	+1.9	99	20	96	70	26	76	26	0	73	78	2.81	+.5	1.66	4	10.3	se.	25	se.	23	12	16	3	4.3	.0	.0	3
Corpus Christi [1]	20	4	33	1,014.6	1,015.2	+.3	83.5	+1.9	98	8	93	70	2	74	26	0	74	79	3.50	+2.0	2.16	6	10.1	se.	26	se.	17	12	17	2	4.5	.0	.0	4
Dallas [1]	512	5	45	997.6	1,015.9	+1.3	85.0	+.8	104	17	96	64	20	74	36	0	64	56	T	−2.9	T	0	8.8	s.	25	n.	3	19	5	7	4.0	.0	.0	0
Fort Worth [1]	679	5	56	991.9	1,015.9	+1.7	84.2	+.6	103	31	95	66	23	73	31	0	65	58	.10	−2.5	.10	1	9.5	s.	34	ne.	3	15	10	6	4.4	.0	.0	0
Galveston [1]	54	106	114	1,014.6	1,016.6	+.7	83.2	−.2	95	2	87	73	13	79	16	0	74	75	.59	−3.1	.36	6	10.8	e.	36	ne.	2	7	17	7	5.5	.0	.0	5
Houston [2]	138	157	190	1,011.2	1,015.9	+.3	83.6	−.1	98	2	92	69	10	75	23	0	72	76	.55	−3.4	.50	3	7.5	se.	26	ne.	2	3	19	9	6.0	.0	.0	3
Palestine	510	64	72	999.0	1,016.6	+2.4	81.4	−.8	100	30	92	63	10	71	29	0	65	62	.25	−2.4	.25	2	5.9	e.	18	se.	30	11	16	4	4.7	.0	.0	3
Port Arthur [2]	34	59	134	1,014.9	1,016.3	+.4	83.6	+.8	97	2	91	69	23	76	22	0	71	78	.82	−6.1	.60	8	10.5	e.	36	ne.	2	8	17	6	5.2	.0	.0	8
San Antonio [1]	693	6	51	991.2	1,015.2	+1.0	84.2	+.4	103	18	97	66	20	71	32	0	66	64	1.00	−1.2	.67	3	8.0	se.	34	e.	12	11	15	5	4.6	.0	.0	5

See footnotes at end of table.

CLIMATOLOGICAL DATA FOR WEATHER BUREAU STATIONS FOR JULY 1947—Continued

District and station	Elevation of instruments: Barometer above sea level	Elevation of instruments: Thermometer above ground	Elevation of instruments: Anemometer above ground	Pressure: Station	Pressure: Sea level	Pressure: Departure from normal	Temperature of the air: Mean	Temperature of the air: Departure from normal	Temperature of the air: Maximum		Temperature of the air: Mean maximum	Temperature of the air: Minimum	Temperature of the air: Date	Temperature of the air: Mean minimum	Temperature of the air: Greatest daily range	Total degree days	Mean temperature of the dew point	Mean relative humidity	Precipitation: Total	Precipitation: Departure from normal	Precipitation: Greatest in 24 hours	Precipitation: Days with 0.01 inch or more	Wind: Average hourly velocity	Wind: Prevailing direction	Wind: Maximum velocity: Miles per hour	Wind: Maximum velocity: Direction	Wind: Maximum velocity: Date	Clear days	Partly cloudy days	Cloudy days	Average cloudiness, tenths	Total snowfall	Snow, sleet, and ice on ground at end of month	Number of days with thunderstorms
OHIO VALLEY AND TENNESSEE	*Ft.*	*Ft.*	*Ft.*	*Mb.*	*Mb.*	*Mb.*	°F	°F	°F		°F	°F		°F	°F	°F	°F	%	*In.*	*In.*	*In.*		*Mi.*								*0–10*	*In.*	*In.*	
							72.1	−3.7										74	3.91	+.2											5.7			
Chattanooga [1]	762	6	66	989.5	1,016.6	+.3	75.4	−2.0	96	30	88	56	24	63	34	0	64	73	2.10	−2.2	.66	8	6.4	n.	32	nw.	14	9	18	4	4.8	.0	.0	7
Knoxville [1]	995	27	53	981.7	1,016.6	+.3	74.6	−2.1	94	31	85	53	23	64	29	0	62	71	3.33	−1.0	1.38	7	7.3	sw.	26	n.	15	6	17	8	5.6	.0	.0	8
Memphis [4]	399	5	86	1,002.7	1,016.3	+.7	78.5	−1.4	100	31	91	52	23	66	32	0	63	64	.63	−2.6	.30	4	7.1	sw.	28	sw.	14	15	10	6	4.1	.0	.0	4
Nashville [1]	546	5	72	997.3	1,016.9	+.6	75.2	−3.9	95	31	87	51	23	64	31	0	62	72	4.56	+.7	2.62	10	7.3	sw.	50	nw.	15	13	11	7	4.7	.0	.0	11
Lexington [1]	989	6	----	981.4	1,016.9	+.6	70.0	−5.9	91	31	80	47	23	60	30	14	61	77	3.01	−.6	.64	14	----	sw.	----	----	----	8	14	9	5.8	.0	.0	10
Louisville [1]	525	106	120	997.6	1,016.6	+.7	72.4	−5.2	93	31	83	49	23	62	30	3	62	72	4.22	+.5	1.21	13	6.3	s.	37	n.	27	9	13	9	5.7	.0	.0	7
Evansville [1]	431	12	40	1,001.0	1,016.6	+1.0	72.8	−3.7	95	31	84	47	23	62	31	6	64	75	3.65	+.2	1.65	12	6.7	nw.	23	e.	27	7	15	9	5.6	.0	.0	9
Indianapolis [1]	823	5	54	986.1	1,015.6	+2.7	70.6	−3.7	90	14	81	46	23	60	31	13	59	71	2.33	----	1.02	11	8.5	sw.	32	sw.	27	7	13	11	5.7	.0	.0	6
Terre Haute [2]	575	68	149	996.3	1,016.9	+1.7	71.6	−5.0	95	14	84	43	23	59	36	13	60	70	.93	−2.2	.41	8	7.7	n.	30	s.	27	8	17	6	5.4	.0	.0	5
Cincinnati [3]	627	11	51	993.9	1,016.9	+1.0	73.2	−1.9	92	30	82	54	23	64	29	1	60	76	4.70	+1.4	1.48	12	4.1	w.	19	nw.	27	7	14	10	5.9	.0	.0	7
Columbus [3]	822	90	110	986.8	1,015.9	+.3	71.0	−3.9	90	14	80	52	23	62	27	7	61	78	6.34	+2.8	3.87	13	7.9	s.	30	n.	8	8	11	12	6.0	.0	.0	5
Dayton [1]	1,003	6	55	980.4	1,015.9	+.7	69.2	−5.7	87	30	78	49	20	60	25	21	59	75	5.44	+2.2	1.71	9	8.7	sw.	36	n.	27	7	11	13	6.3	.0	.0	5
Elkins [1]	1,947	61	78	948.9	1,016.9	+.3	66.0	−3.8	85	15	78	39	24	54	37	46	58	84	5.08	−.3	1.43	16	4.9	nw.	29	nw.	31	4	16	11	6.4	.0	.0	11
Parkersburg	637	77	84	993.2	1,015.9	−.4	71.4	−4.0	90	18	82	47	23	60	34	7	60	74	7.45	+3.2	4.81	12	5.5	se.	38	nw	21	5	8	18	6.7	.0	.0	8
Pittsburgh [1]	842	39	54	985.4	1,015.6	.0	70.0	−3.0	88	30	80	50	23	60	28	16	59	74	4.89	+.8	1.03	16	8.4	sw.	33	nw.	1	1	15	15	7.1	.0	.0	13
LOWER LAKES							70.2	−.6										76	5.70	+2.4											6.4			
Buffalo [1]	768	34	96	986.8	1,014.2	−.7	68.6	−1.4	86	6	77	51	23	60	27	25	61	78	3.54	+.5	.81	16	12.5	sw.	40	sw.	30	4	14	13	6.6	.0	.0	7
Canton	448	10	61	997.3	1,012.9	−.6	69.7	+1.1	88	14	79	48	31	60	30	16	62	80	8.87	+5.4	2.71	20	7.2	w.	25	w.	30	1	12	18	7.5	.0	.0	16
Oswego	335	71	85	1,001.7	1,013.9	−.3	69.8	+.6	90	30	77	55	23	62	25	17	62	79	6.25	+3.3	1.61	15	7.1	s.	24	n.	17	1	13	17	7.4	.0	.0	11
Rochester [1]	523	5	69	995.6	1,014.2	−.7	70.0	+.2	90	30	80	51	3	60	30	20	62	80	9.70	+6.7	2.94	16	8.7	sw.	35	w.	17	1	13	17	7.4	.0	.0	11
Syracuse [1]	396	5	57	992.9	1,014.2	−.7	71.2	+1.9	93	30	81	52	4	61	30	7	62	76	5.41	+1.7	1.03	17	8.5	sw.	29	w.	30	6	10	15	6.6	.0	.0	11
Erie [2]	714	57	81	989.5	1,014.9	+.3	70.4	−.6	88	30	77	54	22	63	30	15	60	79	13.27	+10.3	10.42	14	7.3	w.	24	sw.	27	6	11	14	6.5	.3	.0	10
Cleveland [1]	762	27	54	988.2	1,015.2	+1.0	70.0	−1.9	91	30	80	50	23	60	30	12	60	73	4.69	+1.2	1.28	13	8.7	s.	37	w.	26	3	17	11	6.3	.0	.0	10
Sandusky	629	5	67	992.6	1,015.2	−.4	71.8	−1.6	93	30	81	51	23	62	29	6	----	----	2.40	−1.0	.80	12	7.8	sw.	24	w.	14	10	11	10	5.5	.0	.0	8
Toledo [1]	638	5	47	992.6	1,015.2	−.4	69.8	−2.0	93	30	80	48	23	60	32	21	60	73	1.90	−1.0	.74	9	9.3	sw.	31	sw.	14	6	14	11	6.0	.0	.0	10
Fort Wayne [1]	857	5	33	985.1	1,015.6	.0	70.0	−2.4	91	30	78	47	22	60	30	19	58	70	4.17	+.6	1.10	8	7.4	s.	27	s.	27	7	14	10	5.9	.0	.0	8
Detroit [1]	730	5	78	989.2	1,015.2	−.4	70.8	−.2	93	30	80	51	20	62	27	16	58	68	2.42	−.9	.83	10	9.1	sw.	33	nw.	27	7	13	11	6.0	.0	.0	9
UPPER LAKES							67.8	.0										72	2.44	−.7											4.9			
Alpena	609	5	89	992.6	1,014.9	−.3	66.6	+.7	91	29	75	49	21	58	27	37	58	74	2.92	+.2	.98	11	8.2	nw.	24	nw.	1	11	13	7	5.0	.0	.0	9
Escanaba	612	51	72	993.2	1,015.2	+.3	66.0	.0	93	30	76	42	22	56	37	58	57	75	1.35	−2.0	.87	7	10.5	s.	32	n.	30	11	16	4	4.4	.0	.0	5
Grand Rapids [2]	707	70	244	990.2	1,015.6	−.3	70.8	−1.5	90	30	81	46	22	61	26	22	57	68	2.55	−.4	1.22	9	9.9	sw.	33	sw.	30	12	10	9	5.1	.0	.0	7
Lansing [2]	878	5	90	984.1	1,015.6	+.4	68.2	−2.7	88	30	78	45	22	58	27	33	58	70	3.06	.0	1.18	12	6.7	sw.	18	ne.	7	5	16	10	6.1	.0	.0	10
Marquette	734	44	73	988.2	1,015.2	+.3	65.0	+.1	92	29	75	44	19	55	39	101	56	74	2.35	−.8	1.51	8	6.8	w.	25	sw.	29	11	12	8	5.3	.0	.0	4
Sault Sainte Marie [1]	614	11	52	992.2	1,014.6	−.3	64.3	+1.6	87	29	76	41	31	52	35	95	56	78	1.97	−.7	.82	10	9.3	w.	32	nw.	30	7	14	10	5.6	.0	.0	9
Chicago [1]	673	5	36	992.2	1,016.3	+.7	71.1	−1.6	97	30	82	49	22	60	32	13	58	66	4.10	+.7	2.57	5	8.4	n.	35	n.	27	15	13	3	4.1	.0	.0	5
Green Bay	617	109	141	993.2	1,015.9	+1.3	69.0	−1.0	90	30	80	43	22	58	29	28	58	69	3.26	−.2	1.49	10	7.4	s.	25	w.	26	13	12	6	4.6	.0	.0	7
Milwaukee [1]	681	33	66	991.5	1,016.3	+1.1	68.8	+.6	91	30	78	47	22	60	26	29	58	70	2.17	−.7	.97	8	10	9	n.	32	sw.	30	14	12	5	4.4	.0	.0	6
Duluth [2]	1,133	5	47	947.6	1,015.9	+1.3	67.8	+3.9	95	28	78	44	21	57	31	34	58	74	.69	−3.1	.32	6	9.3	ne.	30	w.	30	12	16	3	4.3	.0	.0	4
NORTH DAKOTA							71.6	+3.6										66	1.45	−1.2											3.8			
Fargo [1]	940	5	43	981.0	1,014.6	+1.1	71.5	+3.4	97	29	84	41	21	59	36	20	58	66	.80	−2.6	.61	6	11.8	s.	33	nw.	29	14	13	4	4.3	.0	.0	4
Bismarck [1]	1,677	5	43	955.3	1,014.6	+1.1	72.6	+3.2	100	28	86	42	21	59	36	12	60	66	1.68	−.6	.71	4	9.4	nw.	50	nw.	12	18	10	3	3.4	.0	.0	8
Devils Lake	1,478	11	44	962.1	1,014.9	+1.4	71.4	+4.0	97	28	84	42	21	58	34	24	56	66	1.70	−.9	1.19	6	7.7	s.	25	sw.	12	15	14	2	3.9	.0	.0	6
Grand Forks [1]	832	4	41	984.8	1,014.9	+1.0	70.0	------	93	28	83	39	21	57	35	27	60	72	2.14	------	1.02	9	----	se.	----	----	----	11	11	9	----	.0	.0	10
Williston	1,878	42	50	947.9	1,013.2	+.7	72.7	+3.8	100	28	86	48	18	60	37	8	55	61	.95	−.9	.53	5	6.4	se.	27	w.	26	18	10	3	3.4	.0	.0	10
UPPER MISSISSIPPI							73.4	−1.4										68	2.30	−1.2											4.3			
Minneapolis-St. Paul [1]	919	43	74	982.4	1,015.2	+1.3	72.8	+.5	98	26	84	49	21	62	32	11	58	64	.96	−2.8	.27	8	9.0	se.	42	sw.	4	15	11	5	4.4	.0	.0	5
La Crosse [1]	714	5	29	990.2	1,015.9	+2.0	70.2	−1.6	93	26	82	41	22	58	32	25	60	72	2.49	−1.4	2.02	8	7.2	s.	36	ne.	26	12	14	5	4.7	.0	.0	11
Madison [2]	974	70	78	981.7	1,016.6	+1.4	70.4	−1.7	94	30	83	42	22	58	34	18	58	68	2.81	−1.1	1.32	10	8.7	sw.	41	n.	26	12	16	3	4.7	.0	.0	7
Charles City	1,015	10	51	980.7	1,016.9	+2.0	71.9	−.4	96	26	84	46	22	60	30	12	----	----	2.53	−1.2	.94	6	5.4	s.	22	sw.	4	23	4	4	2.9	.0	.0	6
Moline [1]	606	6	50	994.9	1,016.9	+1.7	72.2	−1.3	95	30	83	46	22	61	30	10	60	67	4.08	+.8	1.63	10	7.5	n.	38	w.	17	12	16	3	4.4	.0	.0	9
Des Moines [2]	860	5	99	----	1,016.9	+2.7	75.2	−.2	101	29	86	51	22	64	31	2	60	64	.86	−2.6	.63	4	8.1	s.	31	sw.	4	16	8	7	4.2	.0	.0	5
Dubuque	699	81	96	991.5	1,016.6	+1.7	72.6	−1.5	95	30	83	51	22	62	29	6	61	70	6.26	+2.3	2.39	9	4.9	s.	30	ne.	27	11	17	3	4.6	.0	.0	8
Burlington [1]	702	4	36	991.9	1,016.9	+1.7	73.4	−2.4	101	30	86	47	22	61	31	7	62	70	2.97	−.6	1.14	5	8.3	s.	42	nw.	12	16	12	3	4.2	.0	.0	6
Cairo	357	5	99	1,004.1	1,016.6	+1.4	77.5	−3.1	99	31	87	54	23	68	26	0	----	----	1.06	−2.0	.76	5	7.2	sw.	28	nw.	28	10	12	9	5.2	.0	.0	3
Peoria [1]	609	6	26	995.3	1,016.9	+1.0	72.4	−2.0	98	30	84	48	22	61	27	6	60	68	1.64	−1.9	.68	6	7.9	sw.	27	e.	27	10	18	3	4.5	.0	.0	7
Springfield, Ill. [2]	636	5	191	994.2	1,016.9	+2.	75.6	−.91	000	30	86	53	22	65	27	2	60	68	1.26	−1.6	.59	7	9.9	n.	34	sw.	27	15	15	1	3.9	.0	.0	6
St. Louis [2]	568	6	303	996.6	1,016.9	+1.3	77.0	−1.8	101	30	85	57	22	69	26	0	62	64	.68	−2.3	.48	3	9.6	nw.	27	sw.	5	13	14	4	4.4	.0	.0	2
MISSOURI VALLEY							75.9	+.1										66	2.26	−1.4											3.8			
Columbia, Mo. [2]	784	6	66	989.5	1,017.3	+2.4	75.5	−1.8	104	30	86	54	23	65	29	0	62	70	2.03	−1.5	1.04	5	5.5	w.	28	ne.	28	20	9	2	3.1	.0	.0	5
Kansas City [1]	963	38	76	989.8	1,016.3	+2.1	78.8	+.7	107	30	89	58	22	69	29	0	62	58	1.07	−2.8	.46	5	9.2	s.	38	nw.	13	16	12	3	3.9	.0	.0	3
St. Joseph [2]	967	11	49	982.4	1,016.3	+2.4	76.9	−.5	104	30	88	55	19	66	30	2	62	66	1.77	−2.0	1.01	5	6.8	s.	34	w.	13	24	4	3	2.4	.0	.0	7
Springfield, Mo. [1]	1,324	5	60	970.9	1,017.6	+2.0	74.3	−1.9	100	31	85	53	23	63	30	2	62	70	5.41	+1.2	2.48	11	8.6	s.	44	w.	15	12	12	7	4.5	.0	.0	8
Topeka [2]	987	65	87	981.7	1,016.9	+3.0	78.4	+.6	110	30	90	56	23	67	35	2	62	70	2.48	−1.8	1.34	6	7.6	s.	26	n.	13	12	15	4	4.3	.0	.0	4
Lincoln [2]	1,189	11	81	973.9	1,016.3	+2.8	76.6	+.1	105	29	88	54	19	65	31	2	62	66	3.06	−.8	1.88	7	7.6	s.	31	nw.	14	15	9	7	4.2	.0	.0	7
Omaha [1]	1,105	5	68	1,012.2	1,016.6	+2.7	77.0	+1.8	102	29	88	55	21	66	28	0	61	63	2.90	−.6	1.61	6	9.2	s.	52	ne.	12	15	13	3	4.0	.0	.0	6
Valentine	2,598	46	54	925.8	1,015.9	+1.7	73.6	−.1	104	28	86	51	1	61	43	2	57	62	2.35	−.7	2.00	5	8.9	s.	26	w.	19	18	11	2	3.5	.0	.0	6
Sioux City [1]	1,138	5	40	976.6	1,015.6	+1.7	74.7	+1.4	107	29	88	48	21	62	36	3	60	64	.41	−3.1	.22	4	8.9	s.	25	w.	5	18	10	3	4.0	.0	.0	6
Huron [1]	1,301	5	41	969.2	1,015.2	+1.3	72.8	+1.0	101	29	86	43	21	59	35	10	60	68	1.09	−2.1	.53	4	11.6	se.	45	nw.	19	18	8	3	3.8	.0	.0	4
NORTHERN SLOPE							72.0	+3.1										53	.93	−.5											4.1			
Billings [1]	3,570	16	40	892.0	1,012.5	−1.7	74.8	+2.8	103	28	90	48	1	60	45	0	52	50	.27	------	.13	4	9.1	sw.	57	n.	18	14	13	4	4.0	.0	.0	7
Havre	2,507	11	67	925.8	1,012.9	−.3	75.0	+6.7	101	28	91	46	1	59	44	0	46	44	1.13	−.7	.81	7	7.8	sw.	32	w.	29	16	11	4	3.9	.0	.0	9
Helena [1]	4,124	5	43	875.0	1,014.2	+.3	68.8	+3.1	97	6	86	42	1	52	46	11	46	54	.95	−.2	.33	9	7.4	w.	44	w.	11	12	15	4	4.3	.0	.0	16
Missoula [1]	3,205	80	91	902.1	1,014.2	−.7	69.8	+3.0	98	14	88	42	1	51	49	13	44	50	.78	.0	.45	5	6.9	se.	38	sw.	10	18	13	0	3.5	.0	.0	11
Kalispell	2,973	48	56	912.0	1,012.9	−.3	67.8	+3.7	93	14	84	41	26	52	39	26	46	52	.47	−.6	.29	4	5.9	w.	32	s.	14	16	14	1	3.6	.0	.0	8
Miles City [1]	2,371	5	28	930.9	1,013.2	.0	77.0	------	108	28	93	51	1	62	40	0	51	48	.75	------	.30	8	----	se.	----	----	----	18	10	3	3.7	.0	.0	10
Rapid City [1]	3,259	5	63	903.5	1,014.6	+.4	72.7	+1.7	104	28	87	45	1	59	38	5	56	62	.82	−1.3	.50	5	11.6	s.	42	nw.	31	16	11	4	3.9	.0	.0	8
Cheyenne [1]	6,094	5	40	818.2	1,016.3	+2.1	68.6	+1.9	94	26	83	44	1	54	40	18	48	60	1.57	−.2	1.45	8	7.7	w.	33	w.	4	10	15	6	4.8	.0	.0	14
Lander [1]	5,352	60	68	838.5	1,014.9	+1.4	70.6	+3.2	95	28	87	44	1	54	41	4	44	45	.20	−.5	.08	6	7.8	sw.	35	w.	31	11	15	5	4.6	.0	.0	10
Sheridan [1]	3,790	5	38	885.5	1,013.9	.0	72.4	+4.0	104	28	88	43	1	56	43	3	50	52	.30	−.9	.15	4	7.4	nw.	66	w.	18	12	15	4	4.2	.0	.0	8
North Platte [1]	2,821	11	51	918.4	1,015.6	+1.7	74.2	+1.3	102	29	86	49	1	63	37	4	60	70	2.67	−.1	1.80	8	6.1	s.	29	s.	25	12	11	8	5.0	.0	.0	11

See footnotes at end of table.

CLIMATOLOGICAL DATA FOR WEATHER BUREAU STATIONS FOR JULY 1947—Continued

District and station	Elevation of instruments: Barometer above sea level	Elevation of instruments: Thermometer above ground	Elevation of instruments: Anemometer above ground	Pressure: Station	Pressure: Sea level	Pressure: Departure from normal	Temperature of the air: Mean	Temperature of the air: Departure from normal	Temperature of the air: Maximum	Temperature of the air: Date	Temperature of the air: Mean maximum	Temperature of the air: Minimum	Temperature of the air: Date	Temperature of the air: Mean minimum	Temperature of the air: Greatest daily range	Total degree days	Mean temperature of the dew point	Mean relative humidity	Precipitation: Total	Precipitation: Departure from normal	Precipitation: Greatest in 24 hours	Precipitation: Days with 0.01 inch or more	Wind: Average hourly velocity	Wind: Prevailing direction	Wind: Maximum velocity: Miles per hour	Wind: Maximum velocity: Direction	Wind: Maximum velocity: Date	Clear days	Partly cloudy days	Cloudy days	Average cloudiness, tenths	Total snowfall	Snow, sleet, and ice on ground at end of month	Number of days with thunderstorms
MIDDLE SLOPE	*Ft.*	*Ft.*	*Ft.*	*Mb.*	*Mb.*	*Mb.*	°F.	°F.	°F		°F	°F		°F	°F		°F	%	*In.*	*In.*	*In.*		*Mi.*								*0–10*	*In.*	*In.*	
							77.4	−.4										63	1.97	−.9											4.4			
Denver [2]	5,292	106	113	842.2	1,015.6	+1.4	73.6	+1.4	97	26	86	53	1	61	32	2	50	58	1.08	−.6	.35	8	6.8	s.	26	nw.	4	9	12	10	5.3	.0	.0	13
Pueblo [1]	4,690	5	36	860.5	1,015.6	+2.4	74.7	−.5	101	29	91	47	1	59	40	0	52	60	1.24	−.7	.46	12	7.1	nw.	35	sw.	20	14	12	5	4.3	.0	.0	14
Concordia	1,392	50	58	967.2	1,015.9	+2.0	77.6	−.4	106	29	89	56	19	67	33	3	61	62	.49	−3.3	.21	7	7.1	s.	29	nw.	14	15	11	5	4.1	.0	.0	5
Dodge City [1]	2,509	5	58	929.6	1,015.2	+1.7	77.8	−.6	103	30	90	55	1	66	35	6	61	62	2.17	−1.0	1.08	6	14.0	se.	35	nw.	6	17	5	9	4.3	.0	.0	6
Wichita [1]	1,358	6	64	968.5	1,015.9	+2.4	79.0	−.4	105	31	90	58	23	68	33	5	61	62	2.89	−.5	1.45	7	12.4	se.	33	nw.	6	12	14	5	4.2	.0	.0	6
Oklahoma City [2]	1,214	10	47	973.6	1,015.9	+2.0	80.3	−.3	105	17	91	57	23	70	32	0	66	67	5.13	+2.3	2.97	6	8.0	s.	36	n.	3	16	8	7	4.2	.0	.0	7
Tulsa [1]	674	10	61	992.2	1,015.9	-----	78.8	−2.3	104	31	90	59	23	68	33	2	66	68	.80	−2.5	.40	5	8.7	sw.	30	ne.	18	13	12	6	4.4	.0	.0	4
SOUTHERN SLOPE																																		
							82.0	+1.4										52	.75	−1.6										3.6			
Abilene [1]	1,738	4	41	955.0	1,013.9	+.7	85.2	+4.1	102	17	97	65	20	73	33	0	60	49	.92	−1.2	.51	3	12.4	s.	34	n.	18	13	12	6	4.5	.0	.0	6
Amarillo [1]	3,676	5	42	892.4	1,014.6	+.7	78.2	+2.3	100	5	93	57	23	64	38	0	56	54	1.54	−1.3	.81	4	13.4	s.	42	n.	21	15	13	3	3.8	.0	.0	6
Del Rio	960	63	71	981.0	1,013.5	+1.0	84.6	−1.7	100	18	94	71	6	75	24	0	68	62	.41	−2.0	.39	2	9.5	se.	27	se.	29	22	5	4	3.2	.0	.0	1
Roswell	3,566	75	85	895.4	1,014.6	+2.1	80.0	+1.1	102	5	96	55	20	64	41	0	50	42	.13	−2.1	.11	2	8.1	se.	43	w.	17	21	9	1	2.8	.0	.0	4
SOUTHERN PLATEAU																																		
							84.2	+2.7										35	.49	−1.1										4.4			
El Paso [1]	3,778	5	85	887.2	1,011.2	+.7	83.6	+3.9	103	11	96	66	19	71	33	0	50	36	.97	−1.0	.66	4	9.7	se.	34	nw.	18	19	10	2	3.5	.0	.0	5
Albuquerque [1]	5,314	5	48	840.8	1,011.5	+.7	80.2	+3.5	99	12	94	56	19	67	32	0	44	36	.38	−1.0	.13	7	10.1	se.	40	s.	1	16	14	1	3.6	.0	.0	7
Flagstaff	6,907	36	51	795.8	-----	-----	68.0	+2.3	93	27	85	41	11	51	46	12	38	43	1.21	−1.7	.39	8	----	w.	--	-----	--	6	16	9	5.7	.0	.0	9
Phoenix [2]	1,107	39	87	971.2	1,008.8	+.7	93.0	+3.2	113	18	107	73	12	80	39	0	50	28	.13	−.9	.09	3	7.2	w.	28	w.	5	15	8	8	4.6	.0	.0	4
Tucson [1]	2,555	6	30	924.8	1,010.2	+1.4	88.2	+1.8	110	1	102	68	5	74	38	0	52	36	.27	−2.0	.10	5	----	s.	--	-----	--	10	10	11	5.7	.0	.0	10
Yuma	142	9	54	1003.4	1,008.1	+.3	92.4	+1.6	114	18	109	68	12	76	45	0	52	32	T	−.2	T	0	5.2	sw.	20	se.	14	18	9	4	3.4	.0	.0	0
MIDDLE PLATEAU																																		
							72.8	+.6										35	.06	−.5										3.3			
Reno [1]	4,527	20	52	863.5	1,014.2	+1.7	66.6	−1.5	100	17	89	38	25	44	53	27	35	44	.00	−.2	.00	0	8.4	w.	34	nw.	14	27	3	1	1.7	.0	.0	0
Winnemucca	4,339	5	56	867.9	1,012.5	.0	71.7	+1.1	101	19	92	42	1	51	51	0	30	24	.00	−.2	.00	0	7.5	sw.	24	sw.	10	23	7	1	2.2	.0	.0	1
Modena	5,473	10	46	835.8	1,012.5	+1.0	69.8	−.8	96	19	89	39	5	50	49	7	----	----	.21	−.9	.21	1	10.2	sw.	28	sw.	2	20	9	2	3.4	.0	.0	2
Salt Lake City [1]	4,227	32	46	867.6	1,011.5	−.4	77.6	+3.6	101	19	93	48	1	62	43	0	42	34	.01	−.5	.01	1	12.0	se.	34	w.	8	14	8	9	4.4	.0	.0	4
Grand Junction [1]	4,602	60	68	861.5	1,013.5	+.6	78.4	+.7	101	27	94	57	23	63	39	0	48	38	.09	−.5	.07	3	8.9	se.	33	se.	6	14	8	9	4.6	.0	.0	12
NORTHERN PLATEAU																																		
							71.7	+1.2										44	.32	−.2										3.5			
Baker [2]	3,471	36	54	895.4	1,014.2	−.7	68.0	+2.4	97	17	86	41	1	50	48	15	43	54	.06	−.5	.05	2	6.0	n.	20	sw.	17	18	13	2	3.4	.0	.0	5
Boise [1]	2,739	5	49	917.4	1,011.2	−1.3	75.1	+2.6	104	14	92	49	4	58	45	0	40	32	.00	−.2	.00	0	9.2	nw.	30	s.	14	23	7	1	2.8	.0	.0	0
Pocatello [1]	4,478	5	31	863.9	1,013.2	+1.0	72.5	+2.3	97	19	91	40	1	54	50	0	38	35	.09	−.7	.08	2	8.9	sw.	30	w.	23	16	9	6	3.9	.0	.0	8
Spokane [1]	1,929	27	42	946.2	1,013.9	+.4	70.1	+1.1	96	18	85	47	29	55	43	14	45	48	.72	.0	.34	6	6.9	sw.	37	se.	14	15	12	4	4.0	.0	.0	4
Walla Walla	991	57	65	978.7	1,013.9	+.4	74.1	+.1	102	17	87	56	28	62	40	0	----	----	.52	+.1	.37	5	5.4	s.	26	w.	10	20	8	3	3.2	.0	.0	3
Yakima [1]	1,076	58	67	975.6	1,013.9	.0	70.4	−1.0	98	18	87	45	29	54	46	4	46	50	.53	+.2	.28	6	----	nw.	--	-----	--	14	13	4	3.9	.0	.0	2
NORTH PACIFIC COAST																																		
							64.4	+.5										72	2.05	+1.3										5.6			
North Head	211	5	56	1,010.5	1,018.0	−1.0	60.5	+3.3	70	29	65	51	1	56	14	144	55	83	3.37	+2.4	1.74	15	13.1	s.	34	s.	11	3	13	15	6.6	.0	.0	1
Seattle [2]	125	90	321	1,012.9	1,017.6	−.4	65.6	+.1	84	17	75	53	10	56	26	22	52	67	.58	.0	.24	7	8.4	s.	28	sw.	14	8	17	6	5.4	.0	.0	1
Tacoma	194	172	201	1,010.5	1,017.3	−.7	64.2	+1.4	82	17	73	51	9	55	27	45	----	----	1.13	+.5	.48	8	7.8	n.	30	s.	11	9	16	6	5.2	.0	.0	1
Tatoosh Island	86	9	61	1,014.9	1,018.0	−1.0	57.9	+2.8	69	17	62	50	1	53	14	221	55	92	3.85	+2.3	.68	15	9.2	s.	33	s.	12	4	13	14	6.9	.0	.0	0
Medford [1]	1,329	29	58	968.8	1,015.9	+1.7	68.4	−4.3	92	16	82	47	4	55	39	10	50	58	1.35	+1.0	.95	3	----	nw.	--	-----	--	15	12	4	4.0	.0	.0	0
Portland, Oreg. [2]	154	68	106	1,011.9	1,017.6	+.3	67.6	+.9	91	17	77	53	4	58	29	11	54	68	1.30	+.7	.67	8	5.5	nw.	17	w.	24	7	15	9	5.8	.0	.0	1
Roseburg	510	45	76	999.3	1,017.6	+1.0	66.6	−.8	87	13	78	48	4	56	35	19	52	65	2.79	+2.5	1.45	5	4.1	n.	18	sw.	14	5	19	7	5.5	.0	.0	0
MIDDLE PACIFIC COAST																																		
							68.1	+1.1										62	.30	+.3										2.8			
Eureka	60	72	88	1,018.0	1,020.3	+2.3	60.2	+4.7	71	14	65	48	4	55	18	145	54	82	1.20	+1.1	.97	2	7.1	n.	23	n.	19	9	14	8	5.3	.0	.0	0
Red Bluff [1]	-----	-----	-----	1,001.0	1,013.5	-----	78.8	−2.0	106	19	93	58	3	64	36	0	44	34	T	.0	T	0	7.8	se.	28	se.	26	25	5	1	2.2	.0	.0	0
Sacramento [2]	66	92	115	1,011.9	1,014.2	+2.7	73.3	+.1	104	19	89	53	3	58	41	0	50	54	.00	.0	.00	0	8.6	s.	19	s.	2	28	3	0	.7	0	0	0
San Francisco [2]	155	112	132	1,011.5	1,016.9	+2.7	60.2	+1.7	73	19	66	50	1	54	18	154	54	80	T	.0	T	0	13.1	w.	29	w.	30	17	14	0	3.0	.0	.0	0
SOUTH PACIFIC COAST																																		
							73.8	+.5										58	T	.0										2.1			
Fresno [1]	327	5	35	1,001.7	1,012.9	+2.1	79.0	−2.3	107	20	97	56	3	61	42	0	46	37	T	.0	T	0	8.8	nw.	23	nw.	10	30	1	0	1.2	.0	.0	0
Los Angeles	338	223	250	1,001.7	1,013.5	+.3	73.0	+2.8	96	19	85	55	6	61	32	0	56	62	.00	.0	.00	0	5.5	w.	20	w.	27	27	4	0	1.4	.0	.0	0
San Diego [1]	87	20	55	1,010.5	1,013.5	+.6	69.4	+.9	86	28	78	58	10	61	24	0	60	76	.00	.0	.00	0	6.6	nw.	16	nw.	26	17	12	2	3.6	.0	.0	0
WEST INDIES																																		
San Juan, P. R.	82	10	54	1,014.2	1,017.3	-----	80.4	+.3	87	5	84	73	31	77	10	0	74	80	1.41	−4.5	.36	13	14.7	e.	30	e.	31	5	13	13	6.4	.0	.0	5
ALASKA																																		
Anchorage [1]	132	6	44	1,008.1	1,012.9	-----	59.6	+2.6	80	11	69	45	2	50	33	169	48	70	1.27	−.4	.72	6	6.4	s.	29	s.	31	7	11	13	6.3	.0	.0	0
Fairbanks [1]	455	5	63	994.2	1,011.2	-----	62.0	+1.9	88	16	75	41	7	49	39	111	48	66	1.06	−.8	.29	9	6.1	sw.	26	nw.	21	11	7	13	7.6	.0	.0	1
Juneau [1]	80	6	30	1,011.9	1,014.9	-----	56.2	+1.5	82	18	64	39	15	48	35	275	48	76	2.01	−3.4	.44	14	6.8	n.	26	e.	18	3	3	25	8.1	.0	.0	0
Nome	22	10	75	1,008.8	1,009.5	-----	50.9	+.1	75	21	56	40	9	46	25	442	48	88	3.79	+1.3	.75	19	12.1	se.	36	se.	29	2	4	25	8.0	.0	.0	0
Barrow	29	5	27	1,013.5	1,013.9	-----	39.7	−.2	61	16	45	29	6	35	22	785	38	92	.09	−.8	.06	2	11.3	e.	30	e.	12	1	9	21	8.2	T	.0	0
Bethel	28	5	31	1,009.8	1,011.2	-----	52.9	−1.7	75	19	59	42	11	47	28	376	48	86	2.23	−.1	.44	18	9.3	s.	--	-----	--	2	2	27	8.9	.0	.0	0
Cordova	45	5	32	1,012.2	1,014.2	-----	55.3	-----	78	18	64	39	18	47	39	300	50	86	5.30	-----	2.56	14	----	e.	27	se.	31	6	6	19	7.2	.0	.0	0
Gambell	32	5	32	1,004.7	1,005.8	-----	43.5	−1.9	55	21	47	37	11	40	16	666	42	94	2.72	+1.2	-----	21	15.0	s.	39	e.	9	0	0	31	9.0	.0	.0	-----
Ketchikan	25	69	90	1,014.9	1,015.6	-----	57.7	.0	80	18	64	44	2	51	27	233	50	80	6.68	−1.4	2.18	16	5.7	se.	20	se.	3	0	7	24	8.4	.0	.0	1
Kotzebue	20	5	31	1,009.8	1,010.2	-----	56.8	+3.7	79	22	63	46	28	51	27	257	50	79	1.89	+.4	-----	13	11.4	se.	28	se.	12	2	5	24	8.0	.0	.0	0
McGrath	341	5	31	999.3	1,011.9	-----	59.1	+.1	85	21	68	40	1	50	33	197	50	72	3.03	+.7	-----	14	----	s.	--	-----	--	3	10	18	7.6	.0	.0	0
Northway	1,718	5	32	950.2	1,012.5	-----	61.8	+2.5	82	17	74	39	1	50	32	120	47	64	1.08	−1.6	.43	12	6.2	w.	22	w.	31	6	14	11	6.2	.0	.0	7
HAWAII																																		
Honolulu	38	86	100	1,016.6	1,018.0	-----	78.0	+.3	84	17	82	71	2	74	11	0	67	68	.48	−.7	.11	14	9.7	e.	20	e.	6	4	25	2	5.2	.0	.0	0

[1] Data are airport records.
[2] Barometric data (adjusted to old city elevation) and hygrometric data from airport; otherwise city office records.
[3] Observations taken hourly.
[4] Pressure (adjusted to old city elevation), temperature, and hygrometric data from airport; otherwise city office records.
[5] Temperature and precipitation from city records, other data from airport.

NOTE.—Except as indicated by notes [1], [2], [4], and [5] data in table are city office records.

SEVERE LOCAL STORMS FOR JULY 1947

[The table herewith contains such data as have been received concerning severe local storms that occurred during the month. A revised list of tornadoes will appear in the United States Yearbook]

Place	Date	Time	Width of path, yards	Loss of life	Value of property destroyed	Character of storm	Remarks
	July 1947						
Marion, Miss.	1	5 p. m.	[1]1	0	$5,000	High wind, possible tornado.	Path about 2 miles long. Wind estimated at 75 m. p. h., unroofed many houses, blew down trees, and wrecked wires. Some indications of twisting action, and some residents reported funnel not touching ground. Moved from northwest. Damage to growing crops, $4,000.
Colfax County, south-central, N. Mex.	1	5–8:30 p. m.			52,225	Heavy hail, electric.	70 head of cattle killed; 3 autos damaged; considerable damage to railroad roadbed, highways, and bridges.
Hawley, Pa.	1					Thunderstorm	Damage to buildings and trees.
Rooks Co., Kans.	2	10 p. m.	440	0	10,000	Tornado	2 to 5 miles northeast of Plainville. Funnel cloud plainly seen. Moved from southwest; length of path, 2 miles.
Stafford, Pratt, and Kingman Cos., Kans.	3	1–2 a. m.	[1]3–6		450,000	Heavy hail	Storm extended from near Stafford to southwestern Kingman County, with several localities in the 3 counties severely damaged. Hail ranged in size from marbles to oranges. Wheat suffered principal loss. Very heavy rain accompanied storm. Moved from north; length of path, 35–40 miles.
Oklahoma City, Okla., and vicinity.	3	5:40–6 a. m.			22,000	High wind, heavy rain.	Extensive damage to trees, signs, and buildings. Damage to buildings at Oklahoma City University estimated at $20,000. Damage chiefly in northwest residential section of city. Power lines down.
Walsh Co., N. Dak.	3	6:30–8 p. m., C. S. T.	300	8	200,000	Tornado	First struck 3 miles south of Hoople, N. Dak., ended in vicinity of Alvarado, Minn. Probably originated in Manitoba. 11 people killed: 8 in N. Dak., 2 in Minnesota, 1 in Manitoba. 30 injured. Most serious damage done at Warsaw, Walsh Co.: 3 houses demolished, barns and other buildings smashed into kindling wood; debris scattered for miles. Knause Bridge, over the Forest River, 1½ miles east of Warsaw, torn from concrete foundations; steel beams strewn along banks of river. Livestock losses severe. Length of path, about 30 miles.
Oslo, Minn., vicinity of.	3	7:45 p. m.	100	2	80,000	Tornado, hail	A number of farm buildings demolished; farm machinery, automobiles wrecked; poles and wires down; trees uprooted; some damage to growing crops. Livestock and much poultry killed; 7 people injured. Path about 10 miles long, from northwest. Light to heavy hail caused some damage to growing crops.
Anthony, Wis.	3	11 p. m.				Electrical	School building struck by lightning, burned.
Barrett, Minn., and vicinity.	3–4	11 p. m.–12:30 a. m.			10,500	Thundersquall, hail.	Some farm buildings wrecked or damaged; trees uprooted; growing crops lodged; some livestock and poultry killed by wind; damage $9,500. Light to heavy hail caused about $1,000 damage to growing crops.
Sand Spring, Mont., 30 miles west in Garfield Co.	3–4	Midnight	[1]5–10		12,000	Heavy hail, strong wind.	Length of path 10–15 miles; hail size of marbles; considerable damage to wheat, barley, alfalfa, oats, flax, and to windowpanes; $10,000 crop loss.
Heron Lake, Minn., and vicinity.	4	6 a. m.	[1]3		10,000	Hail	Light to heavy hail, accompanying severe thunderstorm, caused considerable damage to growing crops.
Terry, Mont., northeastern portion of Prairie Co.	4	3:30 a. m.	[1]3–4		25,000	Moderate hail	Length of path, 14 miles; considerable damage to barley, spring and winter wheat. Stones ½ inch in diameter.
Virginia, Minn., and vicinity.	4	P. m.				Thundersqualls	A number of buildings damaged; trees uprooted.
Buffalo Co., Wis., northern portion.	4	Night			12,000	Thundersquall	2 barns blown down; 1 barn and other buildings damaged.
Denver, Colo., east of.	5	4:53–6 p. m.			3,000	Hail	Hailstones, size of golf balls, damaged shrubs, gardens, roofs, and windows of houses and automobiles.
Chouteau Co., Mont., Brady Section.	5	5–7 p. m.	[1]1	0		Tornado	Small buildings moved; barn demolished. Path 2 miles long.
Hamilton Co., Kans.	5	8 p. m.		0	30,000	Tornado	Tornado struck airport hangar ½ mile north of Syracuse. Heavy rain and scattered hail caused some damage to crops. Hangar and 13 planes damaged.
Colfax Co., N. Mex.	6	2:30 p. m.			146,923	Heavy hail and electric.	In about same area as July 1 storm; 40 additional livestock killed; fences and stock water ponds damaged; 3 farm buildings struck by lightning.
Penrose and Portland, Colo.	6	3:30 p. m.	1,760		20,000	Hail, rain	Hailstones, size of golf balls, damaged roofs and windows of automobiles and houses; caused loss to cherries, grain; disrupted power and light service.
Rockingham Co., N. C.	6	5 p. m.			(3)	Hailstorm	Tobacco and corn damaged.
Colorado Springs, Colo.	7	2–8 p. m.			150,000	Heavy hail, flood	500 homes flooded; roads and bridges washed out; power and light services disrupted.
East Caroga Lake, N. Y.	7	2:25 p. m.	166	0	5,000	Tornado	Trees uprooted; 2 cottages and garages badly damaged.
Aurora, Colo.	7	4:10 p. m.			5,000	Rain, wind, lightning.	Small buildings blown over; some basements flooded.
Peerless, Mont., in southwest Daniels Co.	7	8 p. m.	440		30,000	Light to heavy hail, high wind, and lightning.	Stones ½ inch in diameter. Barley and wheat damaged. Severe lightning 30 miles east, building struck; property damage not known.
Little Skin Creek near Weston, W. Va.	7–8	Night and early morning.				Heavy thundershower.	Local flash flood caused some damage to crops.
Northwest South Carolina.	8	Morning and afternoon.			25,000	Thunderstorms and hail.	Considerable crop damage locally, particularly in Spartanburg and Calhoun Falls areas.
Cleveland Co., N. C.	8	4 p. m.		1	(3)	Hail, wind	Just above Fallston, guinea-egg-sized hailstones. Growing corn beaten to ground, and leaves completely stripped from cotton plants. 1 man killed by lightning.
Granville Co., N. C.	8	4 p. m.			74,000	Hailstorm	Corn and tobacco damaged.
Tullahoma, Tenn.	8	4:25 p. m.				Wind and hail	Some damage to tobacco.
Jackson and Elbert Cos., Ga.	8	Late afternoon.	[1] ½ to 1		100,000	Hail	Possibly 2 different storms—both severe—one striking in western Elbert County about 3 p. m., the other striking on a line, more or less spotted, over a distance of 20 miles or more from near Commerce, in northeast Jackson County, through central Madison County into western Elbert County; time between 8 and 9 p. m. Much of cotton, corn, truck crops, fruit, etc., beaten to stubs; substantial damage to house roofs and windowpanes. 10 children injured, not seriously, from falling hail which measured up to 1 inch in diameter. One of worst storms ever to hit this section.
Portland and Florence, Colo.	8	P. m.			10,000	Rain	Flooded homes, roads, farms; disrupted power and light services.
Scobey, Mont., southwest Daniels Co.	8	9 p. m.			5,000	Light hail, high wind.	Small hail; light damage to wheat and barley; windmills and granaries blown down.
Hazelton, Idaho, and vicinity.	9	1:30–2 p. m.	[1]1		Considerable.	Heavy hail	Hail up to ¾ inch in diameter caused considerable damage to beans, beets, peas, and grain over area approximately 1 by 2 miles. Storm traveled from southwest to northeast.
Jerome, Idaho, near.	9	2:15 p. m.	[1]3	0		Small tornado	Carried away the airport hangar.
Institute, W. Va., and vicinity.	9	4:30 p. m.				Moderate hail	Damage apparently very slight.
Kersey, Colo.	9	P. m.		1		Lightning	A farmer killed in field.
Optimo, N. Mex.	9	P. m.				Moderate hail	Damage very local.
Lower Yakima Valley, Wash.	10	4:40–7:30 p. m.			58,000	Wind	Crop damage estimated, $30,000; property damage, including that to several parked aircraft, hangar doors, roofs of residences, and utility lines, $28,000.

See footnotes at end of table.

SEVERE LOCAL STORMS FOR JULY 1947—Continued

Place	Date	Time	Width of path, yards	Loss of life	Value of property destroyed	Character of storm	Remarks
	July 1947						
Rawlins Co., Kans.	10	5:30–6 p. m.	[1]1–2		$24,000	Heavy hail	Near Herndon; moved from west; length of path, 4 miles.
Russell, Mont., northwest Chouteau Co.	10	8 p. m.	[1]2½			do	Length of path, 3 miles; 1 to 40 percent damage to wheat, oats, and barley.
Lewistown, Mont., and vicinity.	11	2 p. m.	[1]6		1,000,000	do	Length of path 20 miles. Hailstones size of baseballs. $1,000,000 crop loss, mostly to small grains. All glass on west sides of buildings destroyed.
Elba, N. Y.	11	2:10 p. m.	1,760		250,000	Hail	Heavy hail, with stones 1 to 2 inches in diameter, destroyed muckland onions, lettuce, and spinach over 5-mile-long path.
Winifred, Mont., vicinity	11	2:30 p. m.	[1]12		255,000	Heavy hail	Length of path, 40 miles; hailstones 9 inches in circumference; 50 windows broken in schoolhouse. Estimated $250,000 crop loss to al grains, hay, and small gardens.
Phillips Co., Mont., south of Milk River.	11	4 p. m.	[1]2–5		51,500	Moderate hail, high wind.	Length of path, 50 miles; hailstones ½ to 1 inch in diameter. Damage spotted. Crop loss $50,000, to wheat and sugarbeets. Two or three granaries blown down.
Malta, Mont., and vicinity	11	4 p. m.	[1]1–6	1	51,000	Light to heavy hail, wind.	Length, 50 miles; ¼- to ¾-inch hailstones; $50,000 crop loss to wheat, beets, and gardens. Granaries damaged.
Stanford, Mont., vicinity	11	4 p. m.	[1]10			Moderate to heavy hail.	Length, 8 miles; stones ½ inch in diameter; considerable damage to barley, spring and winter wheat.
Moundsville, W. Va.	11	4:30 p. m.				Strong winds, heavy rain.	Trees uprooted; utility poles snapped; streets and gardens flooded. Roof blown off apartment building, causing $500 damage.
Miles City, Mont., and vicinity.	11	5:25–6 p. m.	[1]4½		2,500	Light to moderate hail.	Length of path, 22 miles; hail, size of marbles. Damaged wheat, oats, alfalfa, and range grass.
Opheim, Mont., and vicinity.	11	5:45–8:30 p. m.	[1]2	0	14,800	Light to moderate hail, tornado.	Length of path, 60 miles. Crop loss, $14,000. Wheat, oats, and barley damaged; blew hay away; broke windows; blew down barn and several other buildings; windmill twisted off.
Glasgow, Mont., and vicinity.	11	6 p. m.	100		500	Hail, high wind	Length of path country-wide. Hail, size of peas. Little damage, only to wheat.
Corry, Pa.	11	6 p. m.				Thunderstorm	Gas station struck by lightning.
Peerless, Mont., southwest Daniels Co.	11	7:30 p. m.				Wind, rain	Considerable damage to buildings and crops.
Chinook, Mont., northeast and southwest Blaine Co.	11					Hail	Considerable damage; approximately 1,500-acre loss of grain crops.
Throughout N. Dak.	12	1–3 a. m.	[1]100		150,000	Severe wind, some hail.	Wind with velocities of 60 to 70 m. p. h., struck most parts of N. Dak. Farm buildings destroyed; at Bismarck, many trees and signs damaged. At Jamestown a radio range tower, some power lines, and telephone poles blown down; windmills and 4 buildings unroofed.
Cass Co., Nebr.	12	8:30–10 p. m.	[1]7		100,000	Wind, hail, and floods.	Hail over path about 25 miles long. Numerous homes, several business houses flooded at Newhawka. Hail damage to corn and oats, about $65,000.
Boone Co., W. Va.	About 12			1		Thunderstorm	One boy killed by lightning and 2 injured.
Doniphan Co., Kans.	13	12:30 a. m.	[1]7		50,000	Severe wind	Some indication of tornado, but most damage from straight wind. Corn and wheat flattened; number of sheds and barns destroyed; roofs blown from houses. Most severe damage a mile west of Highland. Moved from north; length of path, 7 miles.
Lafayette, Ind.	13	7:20 a. m.	880	0	0	Tornado	Path southwest to northeast, about 6 miles long. Did not touch ground.
Southeastern part of Ind.	13	5 p. m.			320,000	Wind, hail	Minor damage general. Much damage in Shelby and Decatur Counties. Some hail up to 2 inches in diameter.
Yuma, Colo.	13	5:30 p. m.			30,000	Hail, wind	Wind and hail caused 20 to 90 percent loss to the wheat crop and wrecked 2 buildings.
Choteau Co., Mont., west of Carter.	13	8 p. m.	[1]1		10,000	Heavy hail	½-inch hailstones; considerable damage to wheat; length of path, 5 miles.
Salem, Ind.	13	9 p. m.			500,000	Flash flood	One of the worst floods on record. Water up to 7 feet deep on Water Street.
Nine Mile Creek, Wyo.	14	1–4 p. m.				Hail	Considerable damage to grain crop.
Granville Co., N. C.	14	3 p. m.			46,000	Hailstorm	Corn and tobacco damaged.
Caswell Co., N. C.	14	Midafternoon			[3]	Hail	Tobacco, corn, and other crops damaged.
Circleville, Ohio	14	Afternoon				Thunderstorm	Observer estimated 5 inches rainfall from 6 to 8 p. m.
Vance Co., N. C.	14	4 p. m.			100,000	Hail	Tobacco damaged.
Scranton, Pa., and vicinity	14	4:30 p. m.				do	Hailstones, size of half dollars, caused extensive damage to gardens.
Sugar Grove, W. Va., and vicinity.	14	5:30–7:30 p. m.	[1]5		48,000	Heavy rain	Local flash flood damaged crops, buildings, and caused loss of livestock.
Holyoke, Colo., west of	14	8 p. m.	[1]10		120,000	Hail	Severe property damage and loss of wheat crop in western Phillips County.
Carlisle, Pa.	14	Evening			500	Thunderstorm	1 home struck by lightning.
Sharon-Valley Forge, Wash.	14	Night				Thunderstorm, wind, hail.	Hailstones, large as walnuts, damaged wheat and peas over small area.
Derry, Pa.	14					Thunderstorm	Some tree limbs ripped off by winds; rain caused damage to gardens.
Ligonier, Pa.	14					do	Electric wires blown down.
North Adams, Mass.	15	5:30 p. m.			30,000	Electrical, heavy rain.	Lightning set fire to College Hall, resulting in extensive damage. Other buildings struck, with only slight damage. Water 3 feet deep in one section of city.
East Palestine, Ohio, near	15	Afternoon			5,000	Thunderstorm	Lightning burned large barn and all contents.
Western Oswego Co., N. Y.	15	7:30 p. m.				Wind	Thunderstorm winds swept over towns of Scriba, New Haven, Mexico, and western Richland, uprooting trees, damaging buildings, and disrupting telephone and electric services.
Westville, S. C., 2 miles east of.	15	Evening		2		Lightning	2 persons killed.
West Palm Beach, Fla.	16	2:17–2:20 p. m.		0		Tornado	Observer at West Palm Beach Airport Station observed funnel cloud in sky to north of station. Tornado reached ground about 10 miles north.
Chatham Co., Ga.	16	3–4 p. m.			1,000	Hail	Hail, as big as hen's eggs, fell over a small area about 15 miles west-southwest of Savannah. Home gardens affected only.
Wayne County, N. C., southern portion.	16	Late afternoon				Wind, rain, and thunderstorm.	Storm assumed tornadic proportions in small section 5 miles northwest of Mount Olive, uprooting trees and demolishing a number of barns and outbuildings. Some crops seriously damaged.
Greenwood, Miss.	16	6:45 p. m.	[1]1		35,000	High winds	Winds at Greenwood airport, 100 m. p. h., before power failure, with gusts 120 m. p. h. 8 Navy training planes wrecked, but not included in loss. Path about 8 miles long, moved from west-northwest to east-southeast. Damage to growing crops, $10,000.
Amherst, Mass.	16	7–8 p. m.	25	0		Small tornado	Storm moved from northeast to southwest over path about ¼ mile long.
Center Square, Pa.	16	8:30 p. m.				Thunderstorm	Barn struck by lightning, burned.
Harrisburg, Pa., and vicinity.	16	Evening				do	Home and church struck by lightning; electric lines damaged.
Franklin, Pa.	16	Unknown		1		do	One man killed by lightning.
Columbus, Mont., vicinity of.	16		880		500	Moderate hail	From west and north, with stones up to marble size. Wheat principal crop hurt. Storm path 1 mile long.
Baltimore, Md., and vicinity.	17	2 p. m.				Thunderstorm, hail, and wind.	Heavy rains inundated streets, disrupting traffic in many sections, some windows smashed and awnings torn by hail; part of Southern Hospital roof blown off, damaging 2 parked automobiles; trees, power lines, and poles down, and large wooden garage damaged.
Mountainair, N. Mex., northeast.	17	3 p. m.			50,000	Heavy hail, wind	Few buildings wrecked by high winds, but principal damage to crops.
Townsend, Mont., north of.	17	3:30 p. m.	[1]15		3,000	Light hail, lightning.	Hailstones ¼–½ inch in diameter; length, 18 miles; no crop loss; $3,000 barn destroyed.

See footnotes at end of table.

SEVERE LOCAL STORMS FOR JULY 1947—Continued

Place	Date	Time	Width of path, yards	Loss of life	Value of property destroyed	Character of storm	Remarks
	July 1947						
Portales, N. Mex.	17	P. m.		1		Severe electric	Lightning struck group of farm workers, killing 1 and stunning 10 others.
Cadiz, Ohio, near	17	Afternoon		1		Thunderstorm	Man killed by lightning.
Columbia, S. C.	18	1:53–2:50 p. m.				do	High winds and excessive rains caused some power interruption and flooding in low areas.
Ryegate, Mont., and vicinity.	18	3:30 p. m.	[1] 1			Light hail	Length, 7 miles; small, soft hail. Some damage to wheat.
Laurel, Mont., south of	18	5 p. m.	[1] 2			Moderate hail	Small stones; 20 to 90 percent of crops damaged, mainly wheat.
Shelby, Mont., and vicinity.	18	6 p. m.	[1] 1		$10,000	do	Length, 6 miles; hailstones size of peas. Crop loss, $10,000, mostly to wheat.
Utica, Miss.	18	9:50 p. m.	440	0	9,000	High wind, hail, possible tornado.	Path 4 miles long. Damage to growing crops, $3,000. Several houses unroofed or twisted from foundations; total destruction of 3 small farm homes. Moved from northwest to southeast.
Southwest Blaine Co., near Missouri Breaks, Mont.	18					Heavy hail	Hail size of hens' eggs caused 100 percent loss to approximately 500 acres of crops.
Harlowton, Mont., and vicinity.	18		[1] 1			Heavy hail, severe wind.	Hailstones ½–¾ inch in diameter. Considerable damage to wheat and flax.
Vicinity of Lake Park, Minn.	19	1:45 p. m.	[1] 2		20,000	Hail, thunderstorm.	Much damage to growing crops.
Center, Colo.	19	2:30 p. m.	5,340		40,000	Hail	¼-inch hailstones caused considerable damage to potatoes, grain, and alfalfa crops, 3 miles northeast of Center.
Corson County, S. Dak.	19	3:50–4:10 p. m.	[1] 4			High wind, rain, and hail.	Damaged crops and property in a 40-mile strip in vicinity of McLaughlin.
Hyde County, S. Dak.	19	6:30 p. m.	[1] 4			do	Damaged crops and property; crippled and killed some livestock and poultry in an area of about 6 miles north of Holabird.
Cut Bank, Mont., to Shelby.	19	8 p. m.	[1] 5		250,000	Heavy hail	Length, 33 miles; hailstones size of marbles. Severe damage to wheat and barley; some roofs and windows damaged.
Holt and Boyd Counties, Nebr.	19	8:30–9 p. m. C. S. T.	[1] 4 to 5		610,000	Hail and wind	Moved from O'Neill to central Boyd County. Hail damage to small grains, about $600,000, principally to wheat, oats, and corn. About $2,000 wind damage to grain in shock and $8,000 to barns. Length of path, 15 miles.
Wibaux, Mont., northeast of.	19					Heavy hail	300 acres of grain damaged.
Pineview, Mont., northeast of, Yellowstone County.	19		Varied			do	Length, 15 miles; hailstones size of hickory nuts; 75 to 90 percent damage to wheat and beets.
Glendive, Mont., and vicinity.	19		[1] 2		60,000	do	Length, 40 miles; ¼-inch hailstones. Severe damage to grain and gardens; crop loss, $60,000.
Lakeville, Pa.	19					Thunderstorm	High winds felled trees, and rain caused considerable damage to gardens and roads.
Cut Bank, Mont., and vicinity.	20	7:30 p. m.	[1] 10		500,000	Heavy hail	Length, 35 miles; stones size of marbles. Crop loss, $500,000. Damage to barley, mustard, and spring wheat; 450 chickens killed.
Cleveland County, N. C., northern portion.	21	3:30 p. m.				Hail and wind	Struck on much the same course as the July 8 storm. Cotton, recovering from previous storm, was whipped to shreds, with 100 percent loss in some fields. County agent estimated loss for 2 storms at $300,000, with $200,000 damage to cotton, $90,000 to corn, and $10,000 to other crops.
Rockingham County, N. C.	21	4 p. m.			[2]	Hail	Tobacco and corn damaged.
Morrill, western half of Box Butte, and eastern Cheyenne Counties, Nebr.	21	3–4:30 p. m. M. S. T.	[1] 5 to 13		3,000,000	Severe hail, strong winds.	Most of damage to wheat crop. Large acreage of sugarbeets materially damaged; chickens and sows killed; small buildings wrecked, mostly by wind. Length of hail-damaged area, 100 miles in Nebraska. Storm extended into South Platte Valley in Colorado.
South of Stockett or Sand Coulee, Mont.	21		[1] Several		50,000	Heavy hail	Hailstones ½ inch in diameter; crops of all kinds destroyed on 25 or 30 farms.
Glendive, Mont., south-central, Dawson County.	22	2–5 p. m.	[1] 3–6		700,000	do	Length, 70 miles; hailstones up to size of eggs. Crops damaged.
Dawson Co., Mont., northwestern portion.	22	2:30–3 p. m.	[1] 4–6		100,000	do	Storm from north; path 50 miles long. Damage mainly to wheat and flax.
Cleveland, Ohio, near	22	Afternoon				Hail	In a few spots hail accumulated in ditches or along curbs in depths up to 18 inches.
Clayton, N. Mex., 20 miles west.	22	3 p. m.			10,000	Heavy hail and wind.	
Prairie Co., Mont., extreme eastern portion.	22	5–5:15 p. m.	[1] 3		1,000	Moderate hail	Hailstones ¼ to ½ inch in diamter caused slight damage, principally to flax and range grass. Storm came from northwest; path 5 miles long.
South of Buffalo, Mont., towards Garneill in Judith Basin.	23	3–3:20 p. m.	[1] 5			Heavy hail	Storm from west, with stones size of marbles; length of path, 5 miles or more. Storm followed by heavy rain.
Miles City, Mont., near	23	Afternoon	[1] 3		6,000	Moderate hail and wind.	Storm from northwest: path 5 miles long. Grain damage by wind, $1,000; hail, $5,000. Stones size of marbles. Duration 15 minutes.
Blaine Co., Mont., northwestern portion.	23	6 p. m.	[1] 3		20,000	Heavy hail	Storm came from west; length of path unknown; damage to grains.
Malta, Mont., near	23	7–7:30 p. m.	[1] 1–2		35,000	Moderate to heavy hail and wind.	Storm from west and northwest caused severe damage to wheat, oats, and flax; damage by hail, $30,000; by wind, $5,000.
Near Cardwell, Mont., Madison Co.	24	3–3:05 p. m.	440		3,000	Moderate hail	Storm from southwest; considerable damage to grains and hay. Stones size of peas.
Helena to Townsend, Mont.	24	Afternoon	[1] 1			Light to moderate hail.	Little damage except to gardens in Helena and some sugarbeet fields. Duration, 5 minutes.
Chouteau Co., Mont., southeastern portion.	25	do				Heavy hail	800 acres completely destroyed with 1,600–2,000 acres partially destroyed, wheat and barley principally. Duration, 30 minutes.
Southeastern Deuel and southwestern Keith Cos., Nebr.	25	4:30–6 p. m. M. S. T.	[1] 4		210,000	do	Principal damage to wheat, oats, and barley. Path about 10 miles long, northwest of Big Springs to north of Brule.
Telegraph Creek, Mont., near.	25	8–9 p. m.	[1] 4–6		65,000	Heavy hail, strong wind.	Damage by ¾-inch hailstones, $50,000; by wind, $15,000. Path 25 miles long. Wheat and oats damaged.
Lincoln Co., about 5 miles southwest of Maxwell, Nebr.	25–26	11 p. m.–3 a.m. C. S. T.	[1] 2		102,000	Windsquall	Hay and grain scattered; wheat and rye shattered and broken. Length of path 8 to 9 miles. Some tornadic characteristics within the larger path.
Glendive, Mont., near	26	12–2 a. m.			10,000	Hail	Hail swept length of county.
Terry, Mont., near	26	12:15–12:27 a. m.	[1] 3		20,000	Hail, wind	½-inch hail in path 10 miles long did considerable damage to wheat and flax. Storm from northwest. Wind caused $500 damage to property and $1,000 to crops.
Wibaux, Mont.	26	1:15–1:35 a. m.	[1] 2		20,000	do	Hail ½-inch diameter caused $10,000 damage to grain over path 5 miles long. Wind caused equal amount of damage to property.
Bismarck, N. Dak.	26	4 a. m.	[1] 5		50,000	Severe wind	A severe thunderstorm struck Bismarck. Many large trees uprooted; plate glass windows broken; wall of brick garage blown out; electric poles blown down.
Wisconsin, central cos.	26–27	5:30 p. m. on 26th–2 a. m. on 27th.		1	159,000	Line squall, electrical, heavy rain, hail.	Local flood damage to highways, bridges, and other property in Trempealeau and Eau Claire Counties, $12,000. 14 barns and other buildings blown down, more damaged; 7 cattle killed; many trees down; utility service disrupted in Wood and other central counties; loss, $120,000. Lightning in Brown and Outagamie Counties burned 2 filled barns, killing 7 cattle and 50 chickens; also burned 2 other buildings; loss, $27,000. Wind, rain, and hail lodged and damaged crops in wide area; loss not estimated.

See footnotes at end of table.

SEVERE LOCAL STORMS FOR JULY 1947—Continued

Place	Date	Time	Width of path, yards	Loss of life	Value of property destroyed	Character of storm	Remarks
	July 1947						
Miles City, Mont., near	26	Evening	[1] 2		$1,400	Hail, wind	Hail size of marbles in a path 5 miles long did slight damage to wheat, barley, and oats. Wind damage to crops amounted to $400.
Golva, N. Dak.	27	2 a. m.	[1] 5		20,000	Severe wind	5 barns blown down; 1 steel grain bin blown over, smashing truck in path.
South Bend, Ind.	27	4 a. m.			1,000	Wind	Trees and wires down.
Pt. Pleasant northeastward to Clarksburg, W. Va.	27-28	5 p. m. on 27th-6 a. m. on 28th.	[1] 50		300,000	Heavy thundershowers, some hail.	Heavy rains and local flash floods damaged crops, gardens, city streets, and highways; undermined foundations and retaining walls; flooded basements.
Morgan and Brown Cos., Ind.	27	5:30 p. m.	880	0	200,000	Tornado	Path northwest to southeast. Considerable damage at Bean Blossom and Fruitdale.
St. Maries, Idaho, and vicinity.	27	5:45 p. m.	[1] 10-12			Strong winds	Strong winds caused an estimated loss of 10 percent to oats
Orange and Lawrence Cos., Ind.	27	7 p. m.	[1] 5		10,000	Wind	Buildings and trees damaged.
Pike Co., Ind.	27	7 p. m.	[1] 4		6,000	Wind and hail	Hail up to 3 inches in diameter.
Columbia, S. C.	28	2:30-9:45 p. m.			10,100	Thunderstorms	Storms did considerable damage to trees and wires, interrupting electric service.
Caswell Co., N. C.	28	Midafternoon				Hail	Estimated total damage by storms on 14th and 28th: to tobacco, $100,000; to corn, $7,000; and to other crops, $2,000.
Greater Boston area, Mass.	28	4:45-5:50 p. m. E. D. S. T.			25,000	Electrical, heavy rain.	Lightning caused minor damage to 12 residences and 2 churches. Fire caused by lightning destroyed barn, 1 horse, and 3 cows in Quincy, Mass.
Rockingham Co., N. C.	28	5 p. m.				Hail	Estimated total damage by storms on 6th, 21st, and 28th: to tobacco, $300,000; to corn, $20,000.
Jacksonville, Fla.	29	3:30-3:45 p. m.	100		3,840	High wind, hail	Building unroofed at Duval County Prison Farm. Hailstones averaged ¼ inch in diameter.
Liverpool, Pa., and vicinity.	29	6:30 p. m.				Thunderstorm	Hailstones up to 1 inch in diameter. Wind, hail, and rain caused extensive damage to crops and gardens, broke windows, uprooted trees, unroofed buildings, and blew down a silo.
Aroostook Co., Maine	31	2-6 p. m.			250,000	Heavy wind and heavy hail.	Maximum damage, due mostly to hail unevenly distributed, confined to 2 narrow strips extending from Eagle Lake to Frenchville, and from Patten to Littleton. Wind 40 to 50 m. p. h.; a barn at Ludlow unroofed. 3,700 acres of potatoes and 300 acres of peas damaged. Hailstones at Houlton, Maine, ½ to ⅞ of an inch in diameter, but in the shape of a flattened disc, with a white, opaque core about the size of a medium pea, surrounded by clear ice to the outer edge.
Luray, Va., airport	31	2-2:30 p. m.	67			Wind	Hangar blown down.
Danville, Va.	31	Afternoon				Electrical	Transformers burned out.
Buena Vista, Va.	31	do		1		Tornadic wind	Considerable structural damage done.
Canaan Valley area, W. Va.	31	do				Heavy thundershower with strong winds.	Damage apparently slight.
Huntington, W. Va.	31	3:23-4:35 p. m.	[1] 3		2,500	Heavy thundershower, hail.	Several buildings struck by lightning. Moderate hail; stones ½-1 inch in diameter.
Albemarle Co., Va., Batesville section.	31	3:45-4:15 p. m.				Hail and wind	4,000-5,000 bushels of peaches destroyed.
Augusta Co., Va.	31	4-6:30 p. m.	[1] 4			Wind and hail	Considerable damage to corn and other crops.
Prince Edward Co., Va.	31	5-6 p. m.	1,760		6,000	Hail and wind	Small area just north of the Keysville tornado path suffered damage mostly from hail, to crops, livestock, and property.
Logan, W. Va.	31	5:20-5:45 p. m.				Thunderstorm with strong winds, moderate hail.	Several buildings damaged, power and telephone lines broken by falling trees.
Roanoke, Salem, and Vinton, Va.	31	5:41-9:13 p. m.				Electrical	Transformers burned out; telephone, telegraph, and power lines out of commission.
Halifax Co., Va.	31	6-9 p. m.			3,000	Hail	Tobacco crop damaged.
Phenix to Rehoboth, Charlotte, and Lunenburg Cos. Va.	31	6:30-7:30 p. m.	[1] 2	0	280,000	Tornado, hail, and wind.	Path of tornado about 20 miles long; funnel cloud bounced over area affected, except in Keysville area where it kept to the ground and where the major damage occurred; areas in both counties away from tornado path also suffered severe damage from hail and wind, especially tobacco.
Bluefield to Oakvale, W. Va., and southeastward into Va.	31	6:30 p. m.				Severe electrical storm with strong winds.	Power and communication lines damaged.
Cardwell, Mont., in Madison Co.	31	9-9:05 p. m.	440		3,000	Hail	Hail size of peas; path 1 mile long; considerable damage to gardens, grains.
Hazelton, Idaho, and vicinity.	31	10:20-10:30 p.m.	[1] 3		30,000	Strong winds	Uprooted trees, blew down utility poles, and caused considerable damage to peas and beans.
Powhatan Co., Va., Jefferson area.	31				20,000	Hail	Tobacco totally destroyed; corn badly damaged.

[1] Miles instead of yards.
[2] See remarks on storm in same area on July 21.
[3] See remarks on storm in same county on July 28.

LATE STORM REPORTS FOR JUNE 1947

[The table herewith contains such data as have been received concerning severe local storms that occurred during the month. A revised list of tornadoes will appear in the United States Yearbook]

Place	Date	Time	Width of path, yards	Loss of life	Value of property destroyed	Character of storm	Remarks
	June 1947						
Trego Co., Kans.	3	Early morning.	[1] 2	.....	$450,000	Heavy hail	Storm originated 8 miles south of Collyer. Hail size of hens' eggs. Principal damage to crops. Length of path, 5 miles.
Keokuk, Iowa	4	do	.....	.....	150,000	Lightning	Lightning struck generator at power house, starting a fire; power off about 8 hours.
Southwest and South-central Iowa.	4-5	Afternoon and night.	.....	3	.....	Heavy rain	Heavy downpour afternoon of 4th over many sections in Dallas, Polk, Warren, Madison, Lucas, Mills, and Montgomery Counties resulted in immediate flash floods; over 5 inches within 18-24 hours at Van Meter, Indianola, Winterset, and Glenwood. Property losses estimated, millions of dollars. For more detail see article "River Stages and Floods".
Tileville, Patterson, Bevington and Stanzel, Iowa.	4	About 5 p. m.	.....	0	.....	Tornado	Small tornado accompanied rainstorm in Madison County; apparently originated near Stanzel along the Adair County line and traveled eastward paralleling Middle River to Tileville and Patterson, dissipating near Bevington. Heaviest damage southeast of Winterset to Bevington. Severe damage to at least 6 farmsteads.
Muscatine, Iowa	7	5:15 p. m.	.....	.....	.....	Rain and hail	1 hailstone 5 inches in circumference and 2 inches long; many hailstones the size of small hens' eggs. Trees stripped; many gardens ruined.
Plymouth, Sioux, Lyon, Osceola, O'Brien, Dickinson and Emmet Cos., Iowa.	9	7-9:30 p. m.	.....	1	300,000	Tornado, hail, high wind, and heavy rains.	Devastating tornado about 7 p. m. in Plymouth County, entered Iowa near Akron along Little Sioux River, and dissipated near Sioux County line. 2 distinct tornadoes; one following the other over slightly different area. Greatest damage in western Plymouth County; over 1,000 buildings damaged or destroyed on at least 300 farms; loss estimated as high as $250,000, mostly property damage; 2 persons injured. Other counties reported high winds, some heavy rains, and scattered hail; damage estimated at $50,000.
Muscatine, Iowa	10	2:10 p. m.	.....	.....	.....	Wind and hail	Freakish windstorm, with rain and hail. Most damage within city; estimated 85 percent by wind and 15 percent by hail. Numerous residential properties damaged by falling trees and branches; some small buildings demolished; greenhouses further damaged. Telephone lines broken.
Broad belt from southwest to northeast Iowa.	11-12	Evening of 11th and most of 12th	.....	.....	.....	Heavy rain	Heavy rains of 3 to nearly 6 inches fell in a broad belt from Pottawattamie to Union Counties northeast to Winneshiek and Clayton Counties. Greatest storm total was 5.92 inches at Van Meter, in Dallas County. Property damage was estimated in millions of dollars; in addition, thousands of acres of bottomland inundated, with little chance of a crop this year. For more details see article "River and Floods" for June 1947.
Central Lyon and Sioux Cos., Iowa.	16	Evening	[1] 3-6	.....	.....	Hail	Storm apparently originated near Hills, Minn., in Rock County; traveled due south, with heaviest damage near Lester, in Lyon Co. Storm path south to Doon, into Sioux County to Hull, and weakened considerably at Sioux Center. Strong winds accompanied the hai Hail lasted about 20 minutes, with stones as large as golf balls. Growing crops stripped rather severely, but reports later indicated corn made good recovery.
Palo Alto, Pocahontas, Humboldt, Webster, and Calhoun Cos., Iowa.	16	do	.....	.....	550,000	Hail, wind, rain	Hail up to 2 inches in diameter reported. Crops beaten into the ground, leaves shredded from trees, gardens ruined, and poultry killed by the strong winds, hail, and heavy rains. Crop damage estimated near $500,000. Hail damage estimated at 70 percent; wind, 10 percent; and rain, 20 percent.
Lyon and Osceola Cos., Iowa.	22	Early afternoon.	.....	.....	.....	Hail	Hail area extended from Ellsworth, Minn., in scattered mile-wide strips along the Iowa-Minnesota border to and including Little Rock and into portions of Osceola County near Sibley and Ocheyedan. Many stones size of baseballs reported at Little Rock. Crops damaged from 25 to 100 percent. Some wind damage near George.
Western half of Iowa	22-23	Afternoon and evening.	.....	2	.....	Heavy rains	Heavy rains fell in several strips, crossing Raccoon, Des Moines, Skunk, and Iowa watersheds; mostly within 4-6 hours; 3½ inches at Cherokee in 40 minutes and 6½ inches at Rockwell City in about 6 hours. 2 persons drowned. For more details see article, "River Stages and Floods".
Union Township, Kossuth Co., Iowa.	22	9:30 p. m.	Narrow	.....	10,000	Tornado, heavy rain.	Small tornado struck 4½ miles northwest of Algona, traveled north to northeast through half dozen farmsteads to vicinity of Burt. Storm path less than 10 miles on ground, since storm lifted at times. Crop damage small.
McPherson Co., Kans.	26	6 p. m.	[1] 4	.....	300,000	Heavy hail	Some hailstones 3 inches in diameter. Main damage to wheat. Length of path, 6 miles.
Rooks Co., Kans.	26	11 p. m.	.....	0	16,000	Tornado and severe wind.	Tornado funnel observed east of town at airport, where hangar and 4 planes badly damaged. Farm property farther east showed evidence of tornado damage. High winds caused light damage in Plainville. Tornado struck several places along its path. Length of path, 11 miles.
Lyon, Osceola, O'Brien, Dickinson, Clay, and Palo Alto Cos., Iowa.	28	Midafternoon	.....	.....	.....	Hail	Heaviest damage in Lyon County, north of Rock Rapids, and east to Little Rock; in area 3 by 6 miles, oats pounded in ground for total loss and corn heavily damaged; hail lasted 15 to 30 minutes and stones as large as baseballs reported. In Osceola County, heaviest loss southeast of Ocheyedan in area 4 by 8 miles. Damage less severe in O'Brien County and mainly in northwest corner. In Dickinson and Clay counties, storm swept from Lake Park to Milford to Spencer and into Palo Alto County; estimated 30,000 acres damaged and total losses expected to be around a million dollars; most severe damage 9 miles west of Milford.
Elkader, Iowa	28	7 p. m.	.....	.....	.....	Rain and wind	2.85 inches of rain fell in 2 hours. Rain accompanied by high winds did minor damage in city. Some hail reported south of Elkader.
Cedar Rapids, Iowa	28	Evening	.....	.....	.....	Wind	Speed up to 65 miles per hour, knocked out many windowpanes and telephone lines in Cedar Rapids; 50 to 75 trees blown down.
Dubuque Co., Iowa	28	8:30 p. m.	.....	2	.....	Wind	Toppled many trees and power lines in Dubuque County, with unusually heavy damage in city of Dubuque. 2 persons were electrocuted from broken high tension wires. Over a dozen farms reported heavy damage. Oats and corn laid low, but expected to recover with little damage.
Alta Vista, Chickasaw Co., Iowa.	30	6 a. m.	.....	.....	.....	Wind	Local windstorm with occasional tornadic-like characteristics, damaged number of buildings on 4 or 5 farms.

[1] Miles instead of yards.

SOLAR RADIATION AND SUNSPOT DATA FOR JULY 1947

[Solar Radiation Investigation Section, I. F. HAND in Charge]

SOLAR RADIATION OBSERVATIONS

TABLE 1.—*Solar radiation intensities during July 1947*

[Gram calories per minute per square centimeter of normal surface]

MADISON, WIS.

Date	Sun's zenith distance A.M. 78.7	75.7	70.7	60.0	0.0	P.M. 60.0	70.7	75.7	78.7	Vapor pressure 7:30 a.m.[1]	1:30 p.m.[1]
	Air mass 4.81	3.84	2.88	1.92	0.96*	1.92	2.88	3.84	4.81		
July	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal*	*cal*	*cal*	*mb*	*mb*
1	0.83	0.91	1.03	1.16	1.39	.....	.....	.....	.....	15.8	12.5
2	.80	.91	1.03	1.19	1.41	.....	.....	.....	.....	11.8	11.0
3	.74	.83	.94	1.06	.....	.....	.....	.....	.....	14.2	14.2
7	.66	.84	.95	1.14	1.34	.....	.....	.....	.....	12.3	11.8
8	.70	.81	.95	1.08	1.31	.....	.....	.....	.....	13.7	13.7
9	.59	.70	.83	1.03	1.24	.....	.....	.....	.....	12.7	12.5
10	.49	.59	.71	.88	1.17	.....	.....	.....	.....	15.3	15.3
12	.40	.50	.64	.....	.....	.....	.....	.....	.....	17.7	19.6
14	.59	.69	.81	1.03	.....	.....	.....	.....	.....	21.1	22.6
17	.....	.35	.48	.65	.....	.....	.....	.....	.....	21.1	23.4
19	.77	.88	.98	1.14	1.36	.....	.....	.....	.....	12.3	10.6
21	.71	.83	.95	1.15	.....	.....	.....	.....	.....	11.0	9.8
22	.59	.66	.81	1.07	1.36	.....	.....	.....	.....	10.6	10.2
23	.61	.71	.84	1.04	.....	.....	.....	.....	.....	11.4	11.8
24	.....	.....	.....	.....	1.17	.....	.....	.....	.....	13.2	12.5
25	.55	.68	.81	.98	1.15	.....	.....	.....	.....	13.7	15.3
26	.....	.....	.....	.80	.....	.....	.....	.....	.....	21.1	25.0
28	.66	.73	.84	1.01	1.31	.....	.....	.....	.....	19.0	21.1
29	.62	.74	.84	.98	1.12	.....	.....	.....	.....	20.4	21.8
30	.....	.....	.....	.72	.....	.....	.....	.....	.....	25.0	29.6
31	.62	.74	.86	.....	.....	.....	.....	.....	.....	15.3	13.7
Means	.64	.73	.85	1.01	1.28	.....	.....	.....	.....	.....	.....
Departures	+.01	−.01	−.02	−.03	.00	.....	.....	.....	.....	.....	.....

LINCOLN, NEBR.

	Air mass 4.77	3.81	2.86	1.91	0.95*	1.91	2.86	3.81	4.77		
July	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*	*mb.*
1	.....	.....	.....	.....	1.41	1.19	1.06	0.94	0.88	14.2	11.0
2	.....	.....	.....	.....	1.36	1.10	.90	.75	.67	15.8	14.2
3	.....	.....	.....	.....	1.26	.92	.75	.62	.52	17.7	21.8
14	.....	.....	.....	.....	1.29	1.10	.....	.....	.....	21.1	23.4
18	.....	.....	.....	.....	1.35	1.17	.99	.....	.....	15.3	15.3
28	.....	.....	.....	.....	1.21	.90	.75	.....	.....	22.6	24.2
29	.....	.....	.....	.....	1.28	.90	.69	.....	.....	21.1	23.4
Means	.....	.....	.....	.....	1.31	1.04	.86	.77	.69	.....	.....
Departures	.....	.....	.....	.....	−.02	−.02	−.02	+.02	+.02	.....	.....

BLUE HILL, MASS.

	Air mass 4.86	3.89	2.92	1.94	0.97*	1.94	2.92	3.89	4.86		
July	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*	*mb.*
2	.....	.....	.....	.....	1.48	1.20	1.04	0.94	0.81	13.7	14.6
3	0.85	0.94	1.06	1.22	.....	.....	.....	.....	.....	14.0	12.5
4	.....	.....	.....	.....	.....	.95	.73	.64	.54	15.1	17.7
5	.69	.75	.84	.96	1.27	.....	.96	.....	.....	13.6	15.2
9	.....	.....	.....	.....	.....	.....	.87	.74	.63	23.2	25.7
13	.....	.....	.....	.69	.....	.....	.....	.43	.34	18.9	19.3
14	.....	.....	.....	.63	.....	.....	.....	.....	.....	21.3	21.7
21	.50	.56	.....	.....	.....	.....	.....	.....	.....	18.4	17.4
24	.....	.....	.....	.....	1.39	1.02	.83	.71	.61	14.3	14.3
25	.66	.76	.89	1.05	1.31	.....	.....	.....	.....	16.4	16.9
26	.....	.73	.81	.99	.....	.....	.....	.....	.....	18.0	18.8
29	.....	.....	.....	1.02	.....	.....	.....	.74	.59	21.2	21.3
30	.66	.74	.85	1.01	.....	.....	.....	.63	.50	19.7	21.2
Means	.67	.75	.89	.95	1.36	1.06	.89	.69	.57	.....	.....
Departures	+.04	+.03	+.02	−.09	+.08	+.05	+.06	.00	−.05	.....	.....

TABLE 1.—*Solar radiation intensities during July 1947*—Continued

[Gram calories per minute per square centimeter of normal surface]

CLIMAX, COLO.

Date	Sun's zenith distance A.M. 78.7	75.7	70.7	60.0	0.0	P.M. 60.0	70.7	75.7	78.7	Vapor pressure 7:30 a.m.[1]	1:30 p.m.[1]
	Air mass 3.24	2.59	1.94	1.29	0.65*	1.29	1.94	2.59	3.24		
July	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*	*mb.*
1	.....	.....	.....	1.43	1.61	1.38	1.25	1.10	1.02	.....	.....
2	.....	.....	1.27	1.38	1.53	.....	.....	.....	.....	.....	.....
4	.....	.....	.....	1.29	1.47	.....	.....	.....	.....	.....	.....
8	.....	.....	1.19	1.36	.....	.....	.....	.....	.....	.....	.....
9	.....	.....	1.26	1.37	1.53	1.35	1.22	1.10	1.03	.....	.....
10	.....	.....	1.30	1.42	1.55	1.37	1.25	1.14	1.02	.....	.....
12	.....	1.26	1.34	1.46	1.57	.....	.....	.....	.....	.....	.....
15	.....	.....	1.19	1.32	.....	.....	.....	.....	.....	.....	.....
17	.....	.....	.....	1.35	1.51	1.32	1.16	1.06	.96	.....	.....
18	.....	.....	.....	1.26	1.50	1.34	1.24	1.14	1.03	.....	.....
19	.....	.....	1.29	1.42	1.50	1.31	1.19	1.10	1.01	.....	.....
24	.....	.....	.....	1.40	1.52	1.34	1.15	1.03	.95	.....	.....
25	.....	.....	1.21	1.35	1.50	1.33	1.23	1.10	1.02	.....	.....
26	.....	.....	.....	1.37	1.46	.....	.....	.....	.....	.....	.....
27	.....	.....	.....	1.31	.....	.....	.....	.....	.....	.....	.....
28	.....	.....	1.12	1.26	1.45	.....	.....	.....	.....	.....	.....
29	.....	1.10	1.18	1.31	1.47	.....	.....	.....	.....	.....	.....
30	.....	1.01	1.13	1.30	.....	.....	.....	.....	.....	.....	.....
31	.....	.....	1.12	1.28	.....	.....	.....	.....	.....	.....	.....
Means	.....	1.12	1.22	1.35	1.51	1.34	1.21	1.10	1.00	.....	.....
Departures	.....	.00	+.02	+.03	+.03	+.04	+.02	+.04	+.04	.....	.....

TABLE MOUNTAIN, CALIF.

	Air mass 3.76	3.01	2.26	1.51	0.75*	1.51	2.26	3.01	3.76		
July	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*	*mb.*
1	.....	.....	.....	1.40	.....	.....	.....	.....	.....	.....	.....
2	.....	.....	.....	1.37	.....	.....	.....	.....	.....	.....	.....
3	.....	.....	.....	1.35	.....	.....	.....	.....	.....	.....	.....
4	.....	.....	.....	1.43	.....	.....	.....	.....	.....	.....	.....
5	.....	.....	.....	1.42	.....	.....	.....	.....	.....	.....	.....
8	.....	.....	.....	1.39	.....	.....	.....	.....	.....	.....	.....
9	.....	.....	.....	1.43	.....	.....	.....	.....	.....	.....	.....
10	1.12	1.20	1.30	1.42	1.55	.....	.....	.....	.....	.....	.....
11	.....	.....	.....	1.41	.....	.....	.....	.....	.....	.....	.....
12	.....	.....	.....	1.42	.....	.....	.....	.....	.....	.....	.....
13	.....	.....	.....	1.43	.....	.....	.....	.....	.....	.....	.....
14	.....	.....	.....	1.43	.....	.....	.....	.....	.....	.....	.....
15	.....	.....	.....	1.39	.....	.....	.....	.....	.....	.....	.....
16	.....	.....	.....	1.38	.....	.....	.....	.....	.....	.....	.....
17	.....	.....	.....	1.32	.....	.....	.....	.....	.....	.....	.....
18	.....	.....	.....	1.34	.....	.....	.....	.....	.....	.....	.....
19	.....	.....	.....	1.42	.....	.....	.....	.....	.....	.....	.....
22	.....	.....	.....	1.35	.....	.....	.....	.....	.....	.....	.....
23	.....	.....	.....	1.43	.....	.....	.....	.....	.....	.....	.....
24	1.12	1.20	1.30	1.43	1.55	.....	.....	.....	.....	.....	.....
25	.....	.....	.....	1.36	.....	.....	.....	.....	.....	.....	.....
26	.....	.....	.....	1.38	.....	.....	.....	.....	.....	.....	.....
27	.....	.....	.....	1.34	.....	.....	.....	.....	.....	.....	.....
31	.....	.....	.....	1.32	.....	.....	.....	.....	.....	.....	.....
Means	(1.12)	(1.20)	(1.30)	1.39	(1.55)	.....	.....	.....	.....	.....	.....
Departures	+.01	.00	.00	+.01	+.02	.....	.....	.....	.....	.....	.....

* Extrapolated. [1] 75th meridian time.

Explanations of the tables and references to descriptions of instruments, stations, methods of observation, and summaries of data are given in the Monthly Weather Review, vol. 72, page 43, January 1944. A list of pyrheliometric stations is given on page 45 of the same Review. An explanation of the formula used in computing the air mass values for each station will be found in vol. 75, page 47, March 1947.

TABLE 2.—*Daily totals and weekly means of solar radiation (direct+diffuse) received on a horizontal surface*

[Gram calories per square centimeter]

Date	Washington, D. C.	Madison, Wis.	Lincoln, Nebr.	New York, N. Y.	Fresno, Calif.	Fairbanks, Alaska	Columbia, Mo.	Boston, Mass.	Nashville, Tenn.	Twin Falls, Idaho	La Jolla, Calif.	Riverside, Calif.	Blue Hill, Mass.	Newport, R. I.	Salt Lake City, Utah	Put-in-Bay, Ohio	State College, Pa.	Davis, Calif.	East Wareham, Mass.	New Orleans, La.	Toronto, Canada	Ithaca, N. Y.	Boulder, Colo.	Pearl Harbor, Hawaii	Honolulu, Hawaii
1947	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*
July 2	739	745	766	718	798	----	741	615	762	707	683	724	727	655	764	658	688	793	606	698	553	349	670	672	550
July 3	775	660	729	668	800	----	748	547	710	702	670	697	675	622	676	722	579	797	599	----	518	346	439	623	622
July 4	664	563	476	726	809	610	655	419	719	684	629	717	496	496	779	611	475	755	446	692	663	394	622	594	592
July 5	679	323	539	621	794	494	166	548	464	682	686	717	686	666	780	517	569	775	600	642	386	319	552	698	706
July 6	544	456	709	570	784	257	616	496	357	630	-------	690	591	552	418	251	490	747	560	436	333	349	531	419	648
July 7	246	723	745	618	771	212	757	603	478	618	-------	674	670	696	794	439	84	782	622	----	458	33	532	574	585
July 8	500	721	641	45	780	271	801	245	533	539	593	695	271	219	----	417	174	776	198	----	292	94	567	604	664
Means	592	599	666	567	791	369	641	496	575	652	652	702	588	558	702	517	437	775	519	622	458	269	559	598	624
Departures	+76	+47	+76	+57	+91	−101	+23	−6	+89	+42	+87	+86	+27	+1	----	−76	−76	+51	−13	+181	−87	−270	−7	----	----
July 9	552	729	710	359	776	297	725	288	433	579	688	715	349	641	----	195	275	745	609	665	447	265	458	518	586
July 10	433	589	614	160	786	623	643	385	403	665	684	725	546	492	----	331	498	770	608	----	580	230	635	541	651
July 11	466	655	547	254	792	669	608	445	494	697	651	696	408	430	----	531	439	746	531	609	578	326	712	697	688
July 12	506	429	721	572	787	674	695	470	580	690	647	692	517	625	----	669	416	751	425	----	419	259	741	621	695
July 13	619	567	739	447	801	667	655	488	460	693	668	693	622	458	----	337	440	724	511	----	556	402	547	649	686
July 14	495	448	705	396	764	595	492	462	484	560	354	673	557	625	----	347	415	752	594	518	558	338	462	641	642
July 15	321	394	726	277	770	556	742	574	520	529	474	673	631	378	----	292	420	761	489	509	341	404	488	674	687
Means	485	544	680	352	782	583	651	445	482	630	595	695	519	521	----	386	415	750	547	575	497	321	577	620	662
Departures	−14	−6	+88	−127	+89	+86	+24	−23	−18	+13	−5	+98	+7	+4	----	−132	−130	+58	+38	+142	−21	−188	+39	----	----
July 16	504	621	472	239	754	559	709	418	471	548	550	667	399	331	----	282	251	729	398	417	454	239	286	549	604
July 17	419	535	176	318	749	409	541	411	531	668	513	658	474	306	----	582	357	702	466	502	287	256	176	648	643
July 18	555	440	750	398	733	255	712	493	234	517	461	643	516	410	----	269	422	742	378	443	335	313	715	629	622
July 19	315	731	662	149	720	484	754	175	491	654	574	639	181	144	----	170	459	745	162	257	234	100	725	610	565
July 20	720	351	670	521	707	586	597	372	639	561	560	551	338	362	----	658	547	706	334	----	658	278	494	540	558
July 21	-------	720	687	406	734	477	780	365	572	549	590	642	439	437	----	547	346	744	405	----	267	209	517	590	630
July 22	536	707	636	176	778	549	801	168	696	610	556	650	178	204	----	359	248	691	200	668	104	197	361	515	541
Means	512	586	579	315	739	474	699	343	519	586	544	636	361	314	----	410	376	723	335	458	334	227	468	583	595
Departures	+25	+50	+4	−146	+59	+42	+92	−85	−2	−30	−7	+59	−125	−162	----	−127	−112	+35	−126	+30	−136	−279	−47	----	----
July 23	691	562	633	649	785	554	592	307	700	635	670	676	373	501	----	711	477	717	498	669	233	245	372	607	699
July 24	666	590	117	635	768	492	669	624	308	600	658	656	654	707	----	644	579	721	653	487	619	386	683	603	702
July 25	651	591	478	597	755	242	416	560	578	653	589	646	568	607	----	651	614	727	556	377	584	356	552	623	556
July 26	628	586	674	554	743	159	682	524	506	654	654	655	602	632	----	418	459	720	556	557	477	313	516	578	638
July 27	606	536	653	488	728	228	571	494	568	641	653	-------	581	590	----	491	462	693	562	----	67	315	597	635	668
July 28	410	655	665	230	735	437	247	340	356	646	640	622	368	309	----	530	525	707	429	655	504	191	601	558	603
July 29	586	602	688	553	713	334	703	432	654	633	648	619	590	605	----	626	599	714	481	----	610	328	418	681	715
Means	606	589	558	529	747	349	554	469	524	638	644	646	533	564	----	582	530	714	535	549	442	305	534	612	654
Departures	+113	+71	+7	+82	+84	−58	−12	+49	+40	+62	+128	+93	+71	+76	----	+56	+45	+89	+78	+117	+16	−159	+25	----	----

ACCUMULATED DEPARTURES ON JULY 29, 1947

	+7,091	−1,757	−3,598	−3,703	+5,929	-----	----	−1,778	−1,883	+763	−4,501	+6,734	−693	−4,718	----	-----	−2,674	+2,107	-----	-----	−4,158	−18,879	+1,099	----	----

POSITIONS, AREAS, AND COUNTS OF SUNSPOTS FOR JULY 1947

By LUCY T. DAY

[Equatorial Division, U. S. Naval Observatory]

[Communicated by the Superintendent, U. S. Naval Observatory.] All measurements and spot counts were made at the Naval Observatory from plates taken at the observatories indicated. Difference in longitude is measured from the central meridian, positive toward the west. Latitude is positive toward the north. Areas are corrected for foreshortening and expressed in millionths of Sun's hemisphere. For each day under Mount Wilson group number, longitude, latitude, area of spot or group, and spot count, are included respectively: number of groups, assumed longitude of center of the disk, assumed latitude of center of the disk, total area of spots and groups, and total spot count.

Date	Eastern standard time	Mount Wilson group No.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Area of spot or group	Spot count	Plate quality	Observatory
1947	h m		°	°	°	°				
July 1	10 35	8677	−59	334	+20	61	48	1	F	U. S. Naval.
		8685	−52	341	+13	53	48	5		
		8680	−43	350	−33	54	48	4		
		8675	−37	356	−27	47	121	9		
		8675	−33	0	−30	46	242	5		
		8674	−34	359	+20	36	12	1		
		8671	−25	8	+17	28	12	4		
		(*)	−19	14	−13	24	24	4		
		8668	−12	21	+15	16	97	8		
		8668	−4	29	+14	12	291	12		
		8683	−6	27	−41	44	12	1		
		8666	+11	44	−23	28	24	6		
		8679	+12	45	−16	21	24	4		
		8670	+21	54	+11	22	24	3		
		8672	+27	60	−19	34	36	5		
		8681	+37	70	−12	40	12	2		
		8673	+48	81	+30	52	36	2		
		(15)		(33)	(+3)		1,111	76		
2	11 8	8689	−80	299	+15	80	194	2	F	Do.
		8677	−46	333	+20	48	73	3		
		8685	−38	341	+13	39	24	4		
		8675	−35	344	−29	47	12	1		
		8675	−23	356	−28	38	121	7		
		8675	−19	0	−30	38	291	1		
		8680	−30	349	−33	46	61	6		
		8674	−20	359	+20	26	12	1		
		8684	0	19	−15	17	12	2		
		8668	+2	21	+15	13	73	4		
		8668	+10	29	+14	15	291	17		
		8687	+5	24	+28	26	12	1		
		8683	+8	27	−41	44	12	1		
		8670	+35	54	+12	36	48	6		
		8673	+61	80	+29	64	12	2		
		(12)		(19)	(+3)		1,248	58		
3	10 21	8691	−77	289	+20	77	97	2	G	Do.
		8689	−70	296	+16	70	145	11		
		8677	−33	333	+21	36	73	7		
		8680	−19	347	−33	40	24	5		
		8675	−10	356	−27	32	48	4		
		8675	−7	359	−30	33	206	1		
		8674	−8	358	+19	18	6	1		
		8688	−7	359	+8	9	24	4		
		8671	+3	9	+15	13	6	1		
		8668	+16	22	+15	20	61	6		
		8668	+23	29	+14	25	194	20		
		8683	+20	26	−42	48	73	7		
		(*)	+31	37	+9	32	12	3		
		8670	+51	57	+12	52	6	1		
		8670	+56	62	+13	57	12	1		
		(12)		(6)	(+3)		987	74		
4	8 55	8693	−78	276	−14	79	291	1	G	Mt. Wilson.
		8691	−66	288	+20	67	121	15		
		8689	−57	297	+17	58	170	20		
		8692	−28	326	−22	38	73	10		
		8677	−20	334	+20	26	73	9		
		8680	−5	349	−32	34	48	16		
		8675	0	354	−26	29	36	5		
		8675	+6	0	−23	26	24	3		
		8675	+6	0	−29	32	194	1		
		8674	+7	1	+21	19	12	1		
		8683	+29	23	−41	51	61	2		
		8683	+37	31	−39	54	24	7		
		8668	+29	23	+16	32	24	4		
		8668	+38	32	+16	39	242	20		
		8670	+65	59	+13	66	6	1		
		(11)		(354)	(+3)		1,399	115		

See footnotes at end of table.

POSITIONS, AREAS, AND COUNTS OF SUNSPOTS FOR JULY 1947—Continued

Date	Eastern standard time	Mount Wilson group No.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Area of spot or group	Spot count	Plate quality	Observatory
1947	h m		°	°	°	°				
July 5	8 53	8693	−71	270	−13	72	97	1	G	Mt. Wilson.
		8693	−71	270	−17	73	109	5		
		8693	−64	277	−13	66	339	1		
		8691	−52	289	+20	54	97	6		
		8689	−43	298	+17	45	121	13		
		(*)	−21	320	+20	27	12	3		
		8692	−16	325	−21	29	97	10		
		8677	−9	332	+19	18	48	15		
		8677	−7	334	+21	19	12	1		
		8680	+5	346	−33	35	48	7		
		8675	+11	352	−32	36	24	3		
		8675	+18	359	−30	38	194	1		
		8674	+14	355	+21	23	12	3		
		8683	+41	22	−42	59	24	3		
		8668	+80	31	+15	51	170	10		
		(11)		(341)	(+3)		1,404	82		
6	10 32	8695	−62	265	−11	64	12	2	F	U. S. Naval.
		8693	−58	269	−17	60	121	2		
		8693	−50	277	−14	53	388	1		
		8691	−38	289	+19	40	73	4		
		8689	−30	297	+16	32	73	12		
		8692	0	327	−22	23	97	7		
		8677	+4	331	+21	18	97	6		
		8677	+18	345	+23	27	24	10		
		8680	+19	346	−35	41	48	1		
		8675	+24	351	−32	42	36	5		
		8675	+30	357	−30	43	194	1		
		8674	+24	351	+19	29	12	3		
		8683	+58	25	−42	68	24	1		
		8668	+64	31	+14	65	145	3		
		(11)		(327)	(+3)		1,344	58		
7	8 51	8696	−73	241	+10	73	145	2	F	Mt. Wilson.
		8695	−48	266	−10	51	121	10		
		8693	−45	269	−13	47	48	12		
		8693	−42	272	−17	46	61	4		
		8693	−37	277	−13	41	339	1		
		8691	−24	290	+20	29	24	10		
		8689	−16	298	+16	20	97	24		
		8697	+11	325	+17	17	12	1		
		8692	+13	327	−21	28	97	9		
		8694	+31	345	−19	39	24	5		
		8680	+35	349	−32	48	48	23		
		8675	+43	357	−29	53	194	3		
		8683	+73	27	−41	80	24	1		
		8668	+77	31	+14	77	97	1		
		(12)		(314)	(+4)		1,331	106		
8	12 9	8700	−85	214	−31	85	388	1	F	U. S. Naval.
		8699	−80	219	+8	80	97	4		
		8698	−78	221	−13	79	48	3		
		8696	−59	240	+10	59	97	2		
		8695	−38	261	−11	41	48	4		
		8695	−31	268	−10	33	73	1		
		8693	−28	271	−17	35	97	5		
		8693	−23	276	−13	28	291	1		
		8691	−16	283	+19	22	12	2		
		8689	0	299	+16	12	73	6		
		8692	+30	329	−21	38	61	1		
		8694	+47	346	−19	51	48	2		
		8680	+52	351	−32	61	48	3		
		8675	+58	357	−29	64	145	1		
		(12)		(299)	(+4)		1,526	36		
9	10 47	8705	−83	204	+23	83	145	3	G	Do.
		8700	−72	215	−31	76	485	2		
		8698	−64	223	−13	66	48	1		
		8699	−63	224	+9	63	97	5		
		8696	−45	242	+11	45	97	6		
		8704	−30	257	−19	38	48	5		
		8695	−20	267	−11	25	145	8		
		8693	−15	272	−17	26	73	3		
		8693	−10	277	−13	20	291	1		
		8703	−10	277	+22	20	12	2		
		8689	+12	299	+18	19	97	9		
		8702	+24	311	−29	41	24	3		
		8692	+43	330	−21	49	24	4		
		8701	+47	334	+23	50	24	1		
		8694	+61	348	−20	65	36	3		
		8675	+69	356	−30	72	194	2		
		(15)		(287)	(+4)		1,840	58		

POSITIONS, AREAS, AND COUNTS OF SUNSPOTS FOR JULY 1947—Continued

Date	Eastern standard time	Mount Wilson group No.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Area of spot or group	Spot count	Plate quality	Observatory
1947	h m		°	°	°	°				
July 10	11 21	8705	−85	188	+28	85	194	5	F	U. S. Naval
		8705	−71	202	+22	71	145	3		
		8700	−59	214	−31	66	533	2		
		8698	−50	223	−13	53	12	1		
		8699	−49	224	+9	49	145	4		
		(*)	−45	228	−23	51	12	1		
		8696	−32	241	+10	33	73	2		
		8704	−16	257	−19	28	12	3		
		8695	−7	266	−11	17	73	5		
		8693	−2	271	−17	21	61	3		
		8693	+3	276	−14	18	291	1		
		8689	+22	295	+17	25	12	1		
		8692	+57	330	−22	61	16	1		
		(11)		(273)	(+4)		1,579	32		
11	10 34	8707	−88	172	+13	88	582	1	F	Do.
		8706	−80	180	+10	80	24	1		
		8705	−69	191	+28	70	242	4		
		8705	−65	195	+26	66	48	2		
		8705	−57	203	+22	59	97	3		
		8700	−48	212	−31	58	533	1		
		8698	−37	223	−13	41	24	1		
		8699	−32	228	+9	33	61	4		
		8696	−19	241	+10	20	12	1		
		8695	+4	264	−11	15	24	3		
		8695	+10	270	−11	18	24	2		
		8693	+15	275	−20	28	12	2		
		8693	+17	277	−15	24	242	1		
		8702	+38	298	−27	47	12	2		
		8702	+47	307	−29	56	12	1		
		8692	+70	330	−21	73	24	1		
		(11)		(260)	(+4)		1,973	30		
12	10 28	8709	−87	160	+12	87	48	1	G	Do.
		8708	−78	169	−34	80	48	1		
		8707	−76	171	+12	76	970	2		
		8706	−67	180	+9	67	73	4		
		8705	−55	192	+28	57	242	8		
		8705	−50	197	+25	53	97	9		
		8705	−43	204	+22	45	145	11		
		8700	−34	213	−31	47	533	1		
		8698	−23	224	−13	28	12	1		
		8699	−18	229	+8	19	24	8		
		8696	−5	242	+9	7	16	1		
		8695	+19	266	−12	24	12	3		
		8695	+26	273	−11	30	6	1		
		8693	+29	276	−20	37	12	2		
		8693	+31	278	−13	34	242	1		
		(11)		(247)	(+4)		2,480	54		
13	10 43	8709	−74	160	+12	74	194	1	G	Do.
		8707	−61	173	+10	61	121	5		
		8707	−60	174	+12	60	824	1		
		8708	−61	173	−32	69	97	2		
		8706	−54	180	+11	55	24	6		
		8711	−48	186	−16	52	6	2		
		8705	−42	192	+29	47	315	5		
		8705	−36	198	+24	40	145	10		
		8705	−29	205	+22	34	121	12		
		8700	−33	201	−30	53	6	1		
		8700	−23	211	−31	42	533	2		
		8699	−10	224	+7	11	16	8		
		8699	−3	231	+7	5	48	12		
		8698	−9	225	−13	19	12	1		
		8696	+9	243	+9	10	12	3		
		8695	+34	268	−14	38	12	3		
		8693	+43	277	−13	46	242	1		
		8710	+53	287	+17	55	24	2		
		(13)		(234)	(+4)		2,752	75		
14	11 34	8715	−78	142	+9	78	242	9	G	Do.
		8713	−65	155	−20	68	12	1		
		8709	−60	160	+11	60	170	2		
		8712	−60	160	+19	60	6	1		
		8707	−49	171	+12	49	679	1		
		8707	−49	171	+10	49	48	6		
		8708	−47	173	−33	48	97	4		
		8706	−41	179	+11	42	121	13		
		8705	−30	190	+28	33	267	5		
		8705	−20	200	+22	26	242	24		
		8705	−15	205	+20	23	194	3		
		8700	−9	211	−31	36	533	4		

See footnotes at end of table.

POSITIONS, AREAS, AND COUNTS OF SUNSPOTS FOR JULY 1947—Continued

Date	Eastern standard time	Mount Wilson group No.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Area of spot or group	Spot count	Plate quality	Observatory
1947	h m		°	°	°	°				
July 14	11 34	8699	+8	228	+7	10	24	9		U. S. Naval
		8699	+14	234	+4	14	12	2		
		8696	+21	241	+10	22	12	1		
		8693	+58	278	−15	60	242	1		
		8710	+67	287	+20	67	24	4		
		(13)		(220)	(+4)		2,925	90		
15	13 52	8715	−64	142	+9	64	485	12	G	Do.
		8714	−56	150	−23	60	6	1		
		8713	−49	157	−20	53	6	1		
		8709	−46	160	+12	47	121	5		
		8708	−37	169	−34	51	24	6		
		8708	−30	176	−33	48	12	1		
		8707	−34	172	+12	36	727	1		
		8707	−34	172	+10	35	24	6		
		8706	−27	179	+10	28	291	17		
		8705	−15	191	+28	29	218	2		
		8705	−9	197	+23	21	24	8		
		8705	−3	203	+20	17	73	6		
		8705	+1	207	+19	15	121	1		
		8700	−2	204	−37	41	12	2		
		8700	+5	211	−33	36	461	2		
		8699	+24	230	+7	25	12	1		
		8716	+51	257	−8	53	6	1		
		8693	+73	279	−15	74	242	1		
		(12)		(206)	(+4)		2,865	74		
16	10 20	8720	−65	129	−5	66	36	15	G	Do.
		(*)	−59	135	−10	60	12	1		
		8715	−55	139	+11	56	436	14		
		8715	−45	146	+11	49	218	12		
		8714	−42	152	−23	49	12	3		
		8713	−34	160	−19	40	6	1		
		8709	−32	162	+12	33	73	5		
		8719	−24	170	+30	35	6	3		
		8708	−24	170	−34	43	12	3		
		8707	−19	175	+12	21	679	1		
		8706	−16	178	+11	17	533	17		
		8705	−3	191	+28	25	194	2		
		8705	+10	204	+20	19	194	9		
		8700	+16	210	−32	39	436	1		
		8717	+22	216	+17	26	12	3		
		8693	+87	281	−15	87	242	1		
		(14)		(194)	(+4)		3,101	81		
17	10 28	8721	−78	103	−21	78	12	3	G	Do.
		8720	−51	130	−4	52	24	2		
		8715	−41	140	+11	41	582	12		
		8715	−35	146	+11	36	436	11		
		8713	−22	159	−19	32	6	1		
		8709	−19	162	+13	21	73	4		
		8719	−15	166	+31	29	12	2		
		8719	−13	168	+29	27	24	2		
		8708	−9	172	−34	39	61	5		
		8707	−6	175	+13	8	776	4		
		8706	−3	178	+11	6	1,018	6		
		8705	+9	190	+28	26	242	3		
		8705	+11	192	+27	25	24	7		
		8705	+20	201	+21	25	12	2		
		8705	+24	205	+21	28	194	3		
		8700	+29	210	−32	46	436	1		
		8717	+36	217	+18	37	6	1		
		(12)		(181)	(+5)		3,938	69		
18	10 25	8726	−85	83	−12	85	194	1	G	Do.
		8721	−64	104	−21	68	36	3		
		8720	−36	132	−3	38	12	4		
		8715	−28	140	+11	29	630	15		
		8715	−21	147	+11	22	485	10		
		8709	−5	163	+9	5	24	2		
		8709	−5	163	+14	11	61	2		
		8725	+1	169	+20	15	48	5		
		8719	+3	171	+29	24	24	5		
		8708	+5	173	−36	41	73	4		
		8724	+7	175	−23	29	12	1		
		8707	+7	175	+13	11	679	2		
		8723	+11	179	+19	18	24	4		
		8706	+11	179	+11	13	1,261	8		
		8722	+13	181	−12	21	16	5		
		8705	+21	189	+29	31	121	4		
		8705	+38	206	+20	40	145	1		
		8700	+42	210	−32	54	485	1		
		(*)	+64	232	−11	66	24	3		
		(16)		(168)	(+5)		4,354	80		

POSITIONS, AREAS, AND COUNTS OF SUNSPOTS FOR JULY 1947—Continued

Date	Eastern standard time	Mount Wilson group No.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Area of spot or group	Spot count	Plate quality	Observatory
1947	h m		°	°	°	°				
July 19	11 45	8726	−76	78	−13	77	242	3	G	U. S. Naval.
		8726	−68	86	−12	70	339	2		
		8721	−53	101	−21	57	48	5		
		8721	−50	104	−20	55	73	4		
		8715	−15	139	+12	16	630	22		
		8715	−7	147	+11	10	582	19		
		(*)	−9	145	+18	17	6	2		
		8709	+7	161	+13	11	97	4		
		8725	+13	167	+19	19	24	4		
		8708	+13	167	−34	41	73	2		
		8708	+20	174	−33	42	48	1		
		8707	+20	174	+14	22	679	2		
		8706	+24	178	+11	25	1,406	33		
		8723	+25	179	+18	28	24	3		
		8705	+35	189	+28	41	97	3		
		8705	+50	204	+20	52	48	1		
		8700	+54	208	−32	62	485	1		
		(12)		(154)	(+5)		4,901	111		
20	10 19	8731	−67	75	+11	67	6	1	F	Do.
		8726	−63	79	−14	65	242	4		
		8726	−57	85	−11	59	436	1		
		8721	−41	101	−23	49	267	14		
		8730	−37	105	−20	44	48	10		
		8729	−16	126	+13	18	6	1		
		8728	−11	131	−3	13	12	2		
		8715	−2	140	+12	7	388	3		
		8715	+5	147	+13	9	436	15		
		8706	+20	162	+13	22	48	2		
		8708	+26	168	−34	45	24	4		
		8708	+32	174	−32	48	12	1		
		8725	+27	169	+20	32	61	6		
		8707	+33	175	+12	34	679	1		
		8706	+37	179	+11	38	1,212	3		
		8723	+38	180	+17	40	6	1		
		8705	+48	190	+28	52	73	3		
		8705	+62	204	+21	62	48	1		
		8700	+67	209	−32	71	485	1		
		(15)		(142)	(+5)		4,489	74		
21	8 48	8732	−67	62	+23	68	24	4	VG	Mt. Wilson.
		8726	−57	72	−17	60	6	1		
		8726	−52	77	−14	55	218	3		
		8726	−44	85	−11	46	339	1		
		8721	−29	100	−23	40	242	8		
		8730	−24	105	−20	35	97	22		
		(*)	−9	120	−14	22	6	2		
		8729	−3	126	+12	7	12	3		
		8727	+1	130	+21	16	12	1		
		8715	+10	139	+13	13	388	18		
		8715	+17	146	+14	21	533	35		
		8713	+21	150	−22	33	12	2		
		8709	+32	161	+13	33	36	1		
		8725	+39	168	+21	41	24	4		
		8708	+45	174	−33	55	12	2		
		8707	+45	174	+13	46	679	1		
		8706	+50	179	+12	51	1,212	14		
		8705	+59	188	+28	60	61	8		
		8705	+75	204	+20	75	48	1		
		8700	+80	209	−31	81	485	1		
		(16)		(129)	(+5)		4,446	132		
22	11 36	8726	−37	77	−13	42	218	9	VG	U. S. Naval.
		8726	−30	84	−11	34	291	5		
		8721	−15	99	−23	32	194	15		
		8730	−8	106	−21	28	170	12		
		8727	+16	130	+20	22	6	1		
		8715	+24	138	+12	24	291	36		
		8715	+33	147	+14	35	485	16		
		8715	+34	148	+6	34	24	7		
		8715	+38	152	+13	39	145	1		
		8709	+47	161	+13	48	12	2		
		8725	+48	162	+21	50	12	5		
		8707	+60	174	+12	60	630	11		
		8706	+63	177	+11	63	1,067	6		
		8706	+67	181	+12	67	339	1		
		8706	+68	182	+10	68	291	4		
		8705	+73	187	+27	74	97	6		
		(10)		(114)	(+5)		4,272	137		
23	10 54	8732	−34	68	+20	37	12	3	VG	Do.
		8726	−23	79	−14	29	242	5		
		8726	−16	86	−11	22	291	10		
		8734	−18	84	+28	29	48	11		
		8721	−3	99	−24	28	73	10		
		8730	+3	105	−21	27	97	13		
		8729	+25	127	+12	27	6	1		
		8727	+26	128	+20	29	97	12		
		8715	+37	139	+12	38	242	12		
		8715	+46	148	+13	47	533	27		
		8715	+49	151	+8	49	48	1		
		8707	+74	176	+14	74	582	2		
		8706	+77	179	+13	77	1,067	9		
		8706	+80	182	+12	80	291	1		
		(10)		(102)	(+5)		3,629	117		

See footnotes at end of table.

POSITIONS, AREAS, AND COUNTS OF SUNSPOTS FOR JULY 1947—Continued

Date	Eastern standard time	Mount Wilson group No.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Area of spot or group	Spot count	Plate quality	Observatory
1947	h m		°	°	°	°				
July 24	10 32	8736	−82	7	+15	82	73	1	G	U. S. Naval.
		8735	−38	51	−19	45	12	6		
		8732	−21	68	+20	26	24	2		
		8726	−10	79	−15	22	242	4		
		8726	−3	86	−11	17	267	9		
		8734	−5	84	+29	25	61	6		
		8734	−1	88	+27	23	121	10		
		8721	+11	100	−24	32	48	5		
		8730	+17	106	−21	31	73	7		
		8727	+39	128	+20	41	73	3		
		8715	+50	139	+11	51	339	15		
		8715	+58	147	+12	58	776	18		
		8707	+88	177	+12	88	145	4		
		8706	+88	177	+10	88	97	1		
		(11)		(89)	(+5)		2,351	91		
25	10 15	8736	−69	6	+15	69	73	3	VG	Do.
		8738	−62	13	−10	64	48	2		
		8735	−22	53	−19	32	12	2		
		8732	−8	67	+22	18	73	12		
		8737	−7	68	−13	19	12	3		
		8726	+3	78	−15	20	218	4		
		8726	+11	86	−11	19	218	4		
		8734	+7	82	+30	26	61	1		
		8734	+13	88	+27	27	291	20		
		8721	+25	100	−24	38	24	6		
		8730	+30	105	−21	40	73	10		
		8727	+51	126	+20	53	61	10		
		8715	+65	140	+13	65	921	11		
		8715	+73	148	+13	73	630	1		
		(11)		(75)	(+5)		2,715	89		
26	11 46	8742	−70	351	−20	71	6	1	F	Do.
		8736	−56	5	+16	58	97	3		
		8741	−39	22	−26	48	24	1		
		8740	−19	42	+10	20	24	3		
		8739	−1	60	−16	21	24	1		
		8732	+7	68	+22	18	73	6		
		8737	+8	69	−13	21	24	3		
		8726	+16	77	−15	27	194	1		
		8726	+24	85	−12	29	218	4		
		8734	+20	81	+31	33	61	1		
		8734	+28	89	+27	36	461	13		
		8721	+39	100	−24	46	97	2		
		8730	+43	104	−22	50	73	2		
		8715	+79	140	+13	79	970	3		
		(12)		(61)	(+5)		2,346	44		
27	10 31	8742	−57	35	−21	61	24	1	F	Do.
		8742	−49	0	−20	54	73	10		
		8736	−42	7	+18	43	97	3		
		8741	−25	24	−24	38	12	3		
		8741	−21	28	−25	36	12	1		
		8740	−7	42	+11	10	6	1		
		8739	+12	61	−17	25	12	1		
		8732	+16	65	+23	23	36	1		
		8732	+19	68	+20	24	61	7		
		8737	+20	69	−14	27	12	1		
		8726	+29	78	−15	35	194	1		
		8726	+37	86	−12	41	206	1		
		8734	+32	81	+30	39	145	5		
		8734	+37	86	+27	42	121	9		
		8734	+41	90	+28	46	339	1		
		8730	+56	105	−22	60	97	5		
		(10)		(49)	(+5)		1,447	51		
28	12 33	8744	−71	323	+19	71	48	2	F	Do.
		8742	−42	352	−21	47	48	3		
		8743	−36	358	−21	44	145	12		
		8743	−30	4	−21	39	73	1		
		8736	−29	5	+17	32	61	2		
		8739	+27	61	−16	35	12	1		
		8732	+32	66	+21	35	48	4		
		8726	+42	76	−14	45	194	1		
		8726	+51	85	−12	53	194	1		
		8734	+45	79	+31	50	97	2		
		8734	+50	84	+28	54	145	5		
		8734	+54	83	+28	57	339	1		
		8730	+70	104	−23	73	48	1		
		(9)		(34)	(+5)		1,452	36		
29	10 26	8745	−69	313	−20	72	630	21	G	Do.
		8744	−59	323	+19	59	121	3		
		8742	−30	352	−20	40	12	2		
		8743	−22	0	−21	35	121	11		
		8743	−18	4	−21	33	97	1		
		8736	−16	6	+16	19	61	2		
		8732	+45	67	+19	47	6	1		
		8726	+56	78	−14	59	158	2		
		8726	+64	86	−12	65	194	1		
		8734	+56	78	+32	59	24	3		
		8734	+67	89	+28	69	291	2		
		(8)		(22)	(+6)		1,715	49		

POSITIONS, AREAS, AND COUNTS OF SUNSPOTS FOR JULY 1947—Continued

Date	Eastern standard time	Mount Wilson group group No.	Heliographic				Area of spot or group	Spot count	Plate quality	Observatory
			Difference in longitude	Longitude	Latitude	Distance from center of disk				
1947	h m		°	°	°	°				
July 30	10 27	8745	−55	314	−19	61	1,600	18	G	U. S. Naval.
		8744	−46	323	+20	48	194	1		
		8748	−12	357	+18	17	12	3		
		8743	−9	0	−20	27	145	8		
		8743	−5	4	−20	27	170	8		
		8746	−8	1	+11	10	12	3		
		8736	−3	6	+17	12	61	2		
		8726	+69	78	−14	70	145	2		
		8726	+78	87	−13	79	194	1		
		8734	+80	89	+28	80	291	2		
		(8)		(9)	(+6)		2,824	48		
31	8 53	8749	−80	277	−9	80	242	3	F	Mt. Wilson.
		8750	−80	277	−14	80	97	1		
		8745	−50	307	−19	57	533	1		
		8745	−42	315	−18	48	1,067	24		
		8744	−34	323	+19	36	145	7		
		8743	+4	1	−19	25	97	12		
		8743	+8	5	−19	27	388	10		
		8748	+2	359	+20	14	24	4		
		8746	+5	2	+11	6	6	1		
		8736	+10	7	+17	15	36	2		
		(8)		(357)	(+6)		2,635	65		

Mean daily area for 31 days=2,496
Mean 10 g + s for 31 days=191.4

*Not numbered.
VG=very good; G=good; F=fair; P=poor.

PROVISIONAL RELATIVE SUNSPOT NUMBERS FOR JULY 1947

[Dependent on observations at Zurich Observatory and its stations at Locarno and Arosa]

July 1947	Relative numbers	July 1947	Relative numbers	July 1947	Relative numbers
1	140	11	144	21	225
2	125	12	145	22	214
3	167	13	180	23	195
4	155	14	210	24	179
5	147	15	220	25	147
6	160	16	210	26	151
7	177	17	213	27	128
8	131	18	179	28	130
9	160	19	228	29	122
10	165	20	212	30	121
				31	146

Mean, 31 days=168.6

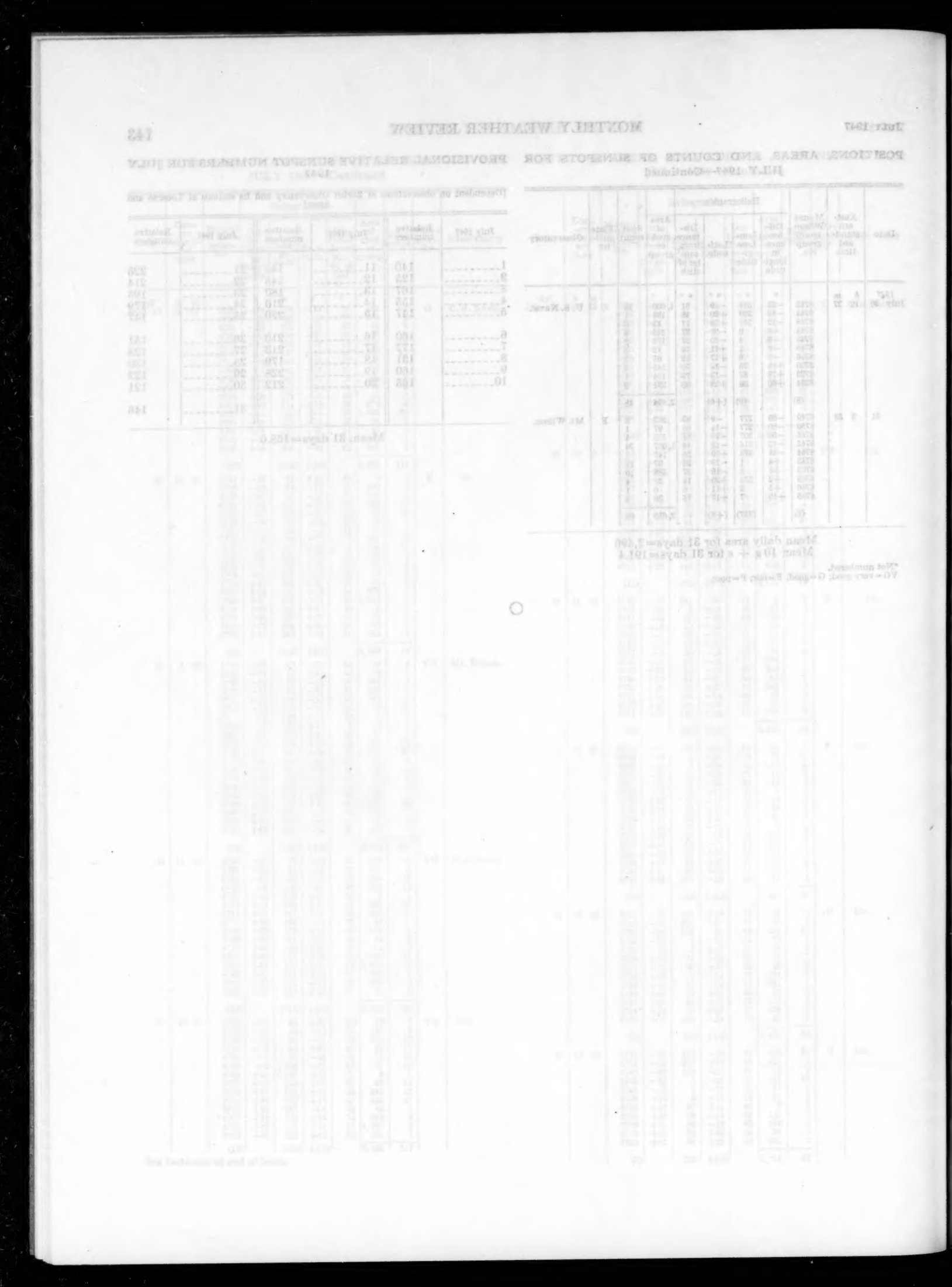


Chart I. Departure (°F.) of the Mean Temperature from the Normal, and Wind Roses for Selected Stations, July 1947

Chart I. Departure (°F.) of the Mean Temperature from the Normal, and Wind Roses for Selected Stations, July 1947

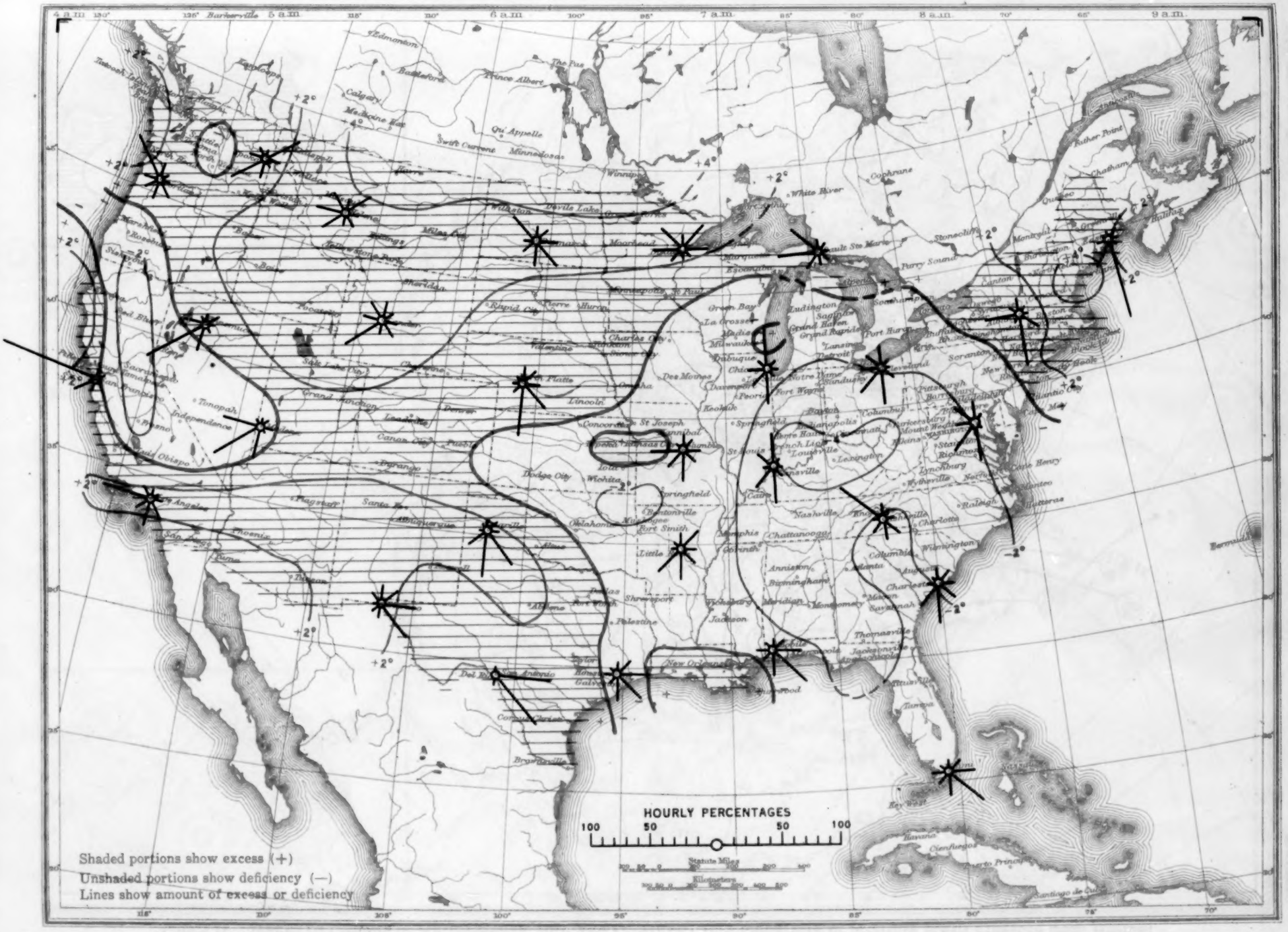
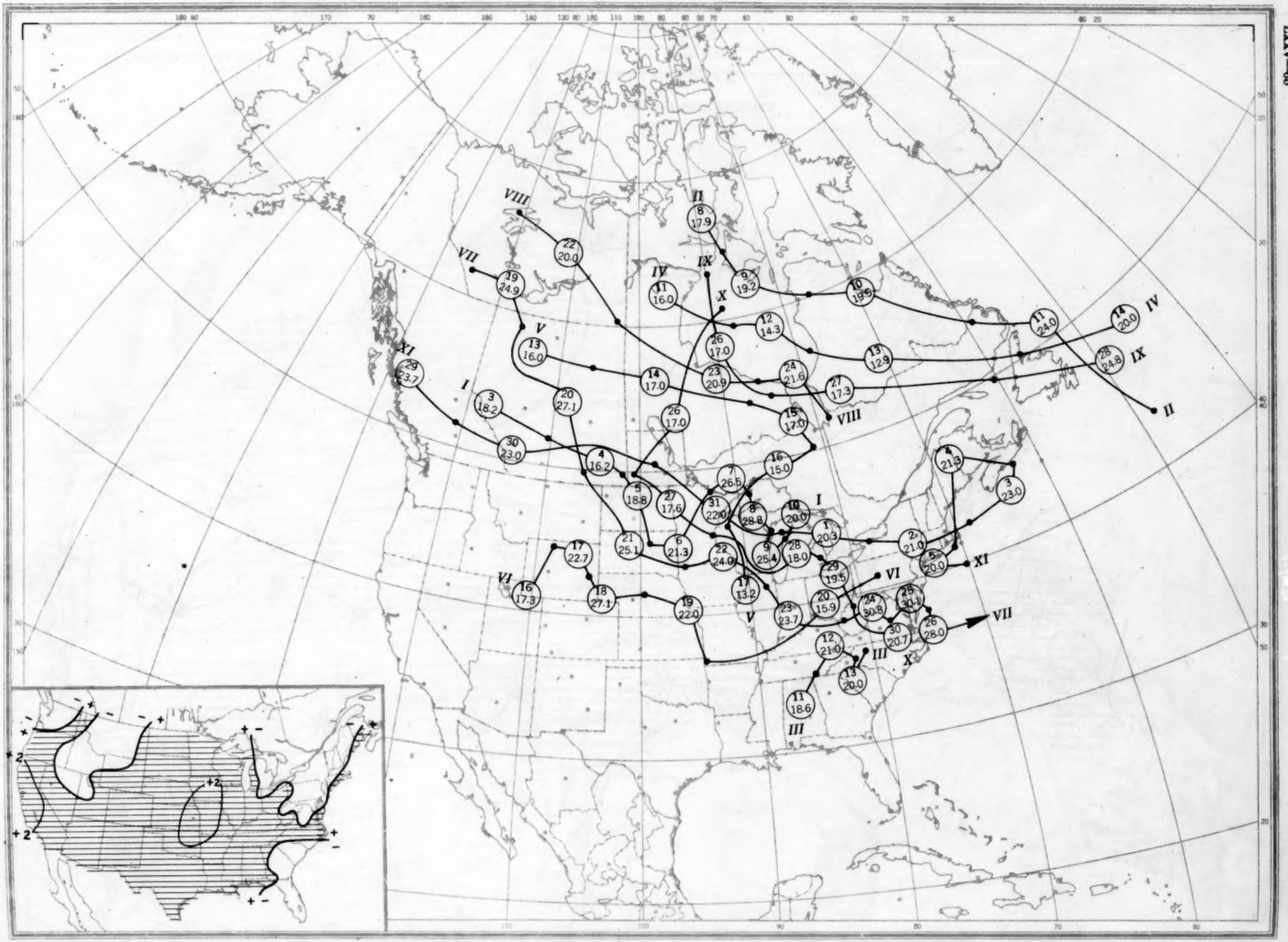


Chart II. Tracks of Centers of Anticyclones, July 1947. (Inset) July Departure of Monthly Mean Pressure from Normal

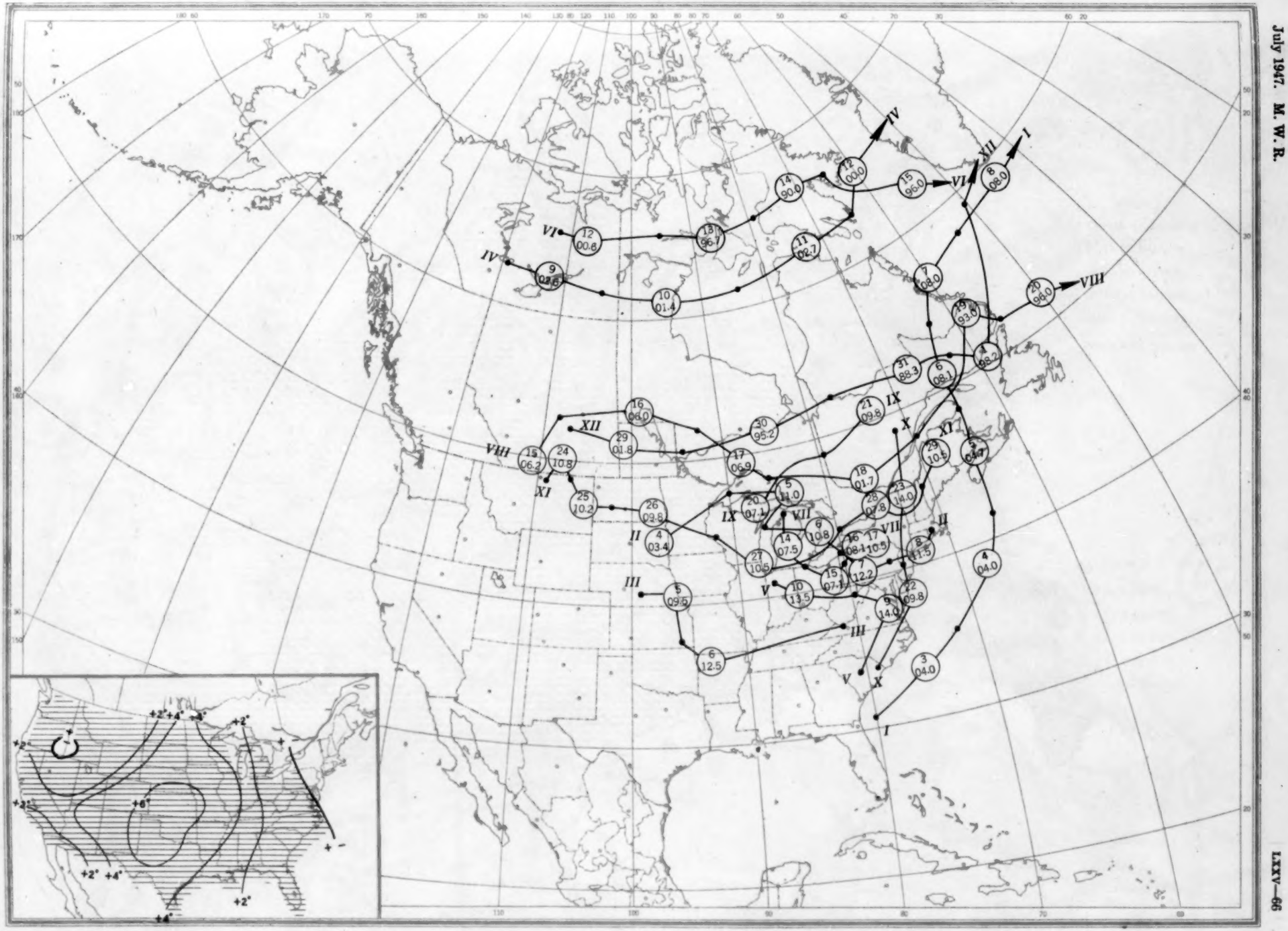


Circle indicates position of anticyclone at 7:30 a. m. (75th meridian time), with barometric reading. Dot indicates position of anticyclone at 7:30 p. m. (75th meridian time)

Chart III. Tracks of Centers of Cyclones, July 1947. (Inset) Change in Mean Pressure from Preceding Month

Circle indicates position of anticyclone at 7:30 a. m. (75th meridian time), with barometric reading. Dot indicates position of anticyclone at 7:30 p. m. (75th meridian time)

Chart III. Tracks of Centers of Cyclones, July 1947. (Inset) Change in Mean Pressure from Preceding Month



Circle indicates position of cyclone at 7:30 a. m. (75th meridian time), with barometric reading. Dot indicates position of cyclone at 7:30 p. m. (75th meridian time)

Chart IV. Percentage of Clear Sky Between Sunrise and Sunset, July 1947

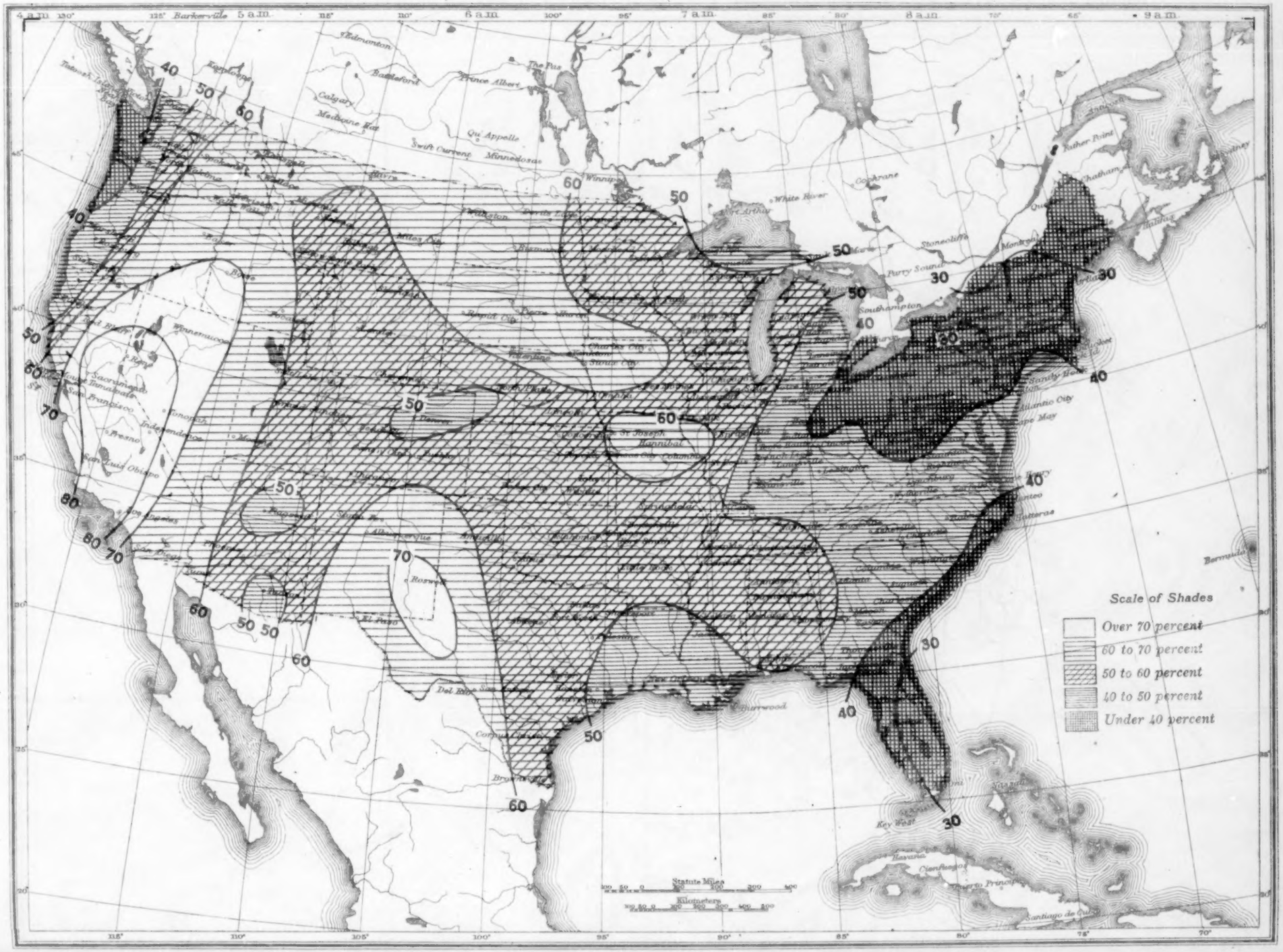


Chart V. Total Precipitation, Inches, July 1947. (Inset) Departure of Precipitation from Normal

Chart V. Total Precipitation, Inches, July 1947. (Inset) Departure of Precipitation from Normal

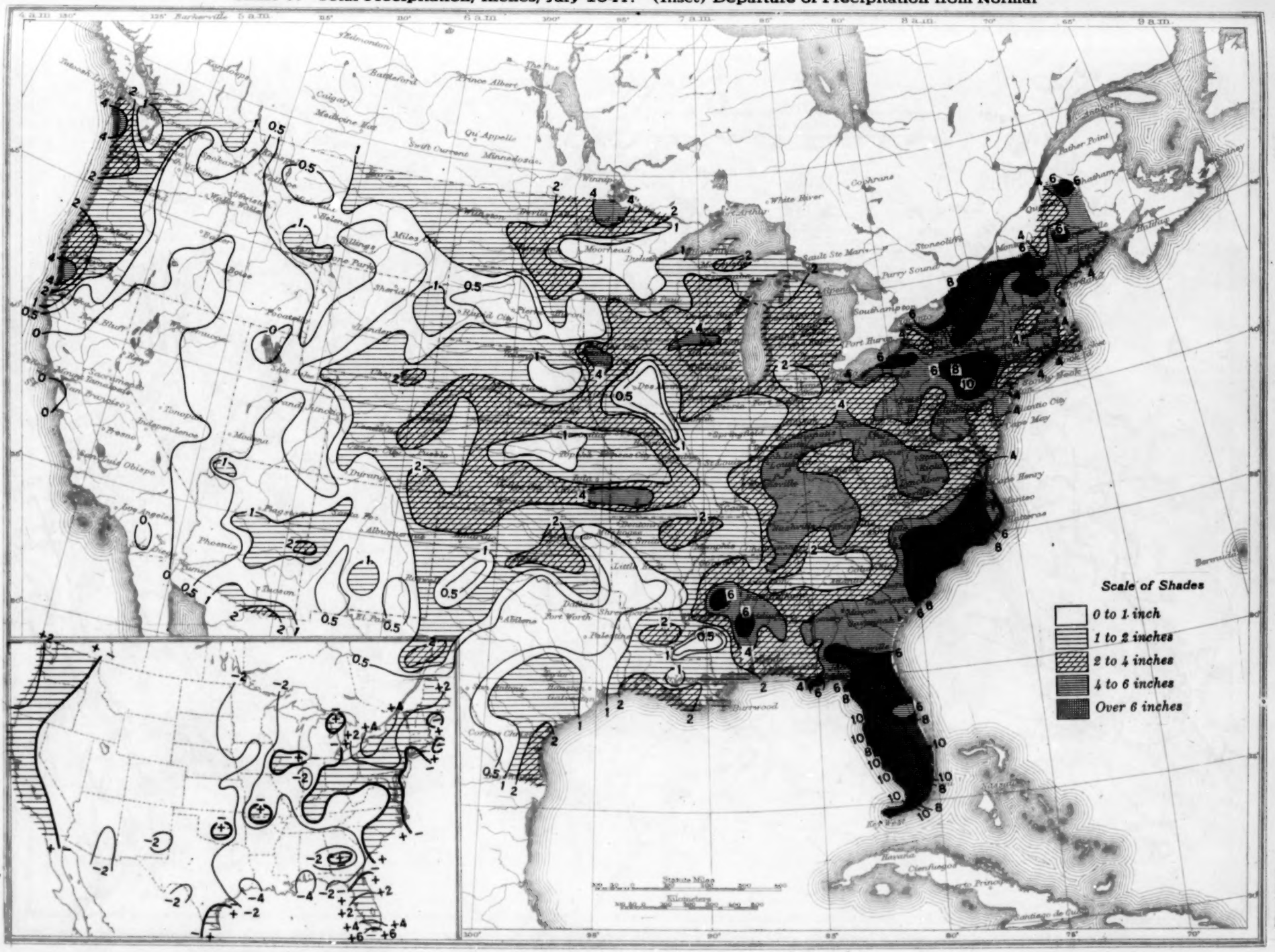


Chart VI. Isobars (mb.), at Sea Level and Isotherms (°F.) at Surface; Prevailing Winds, July 1947

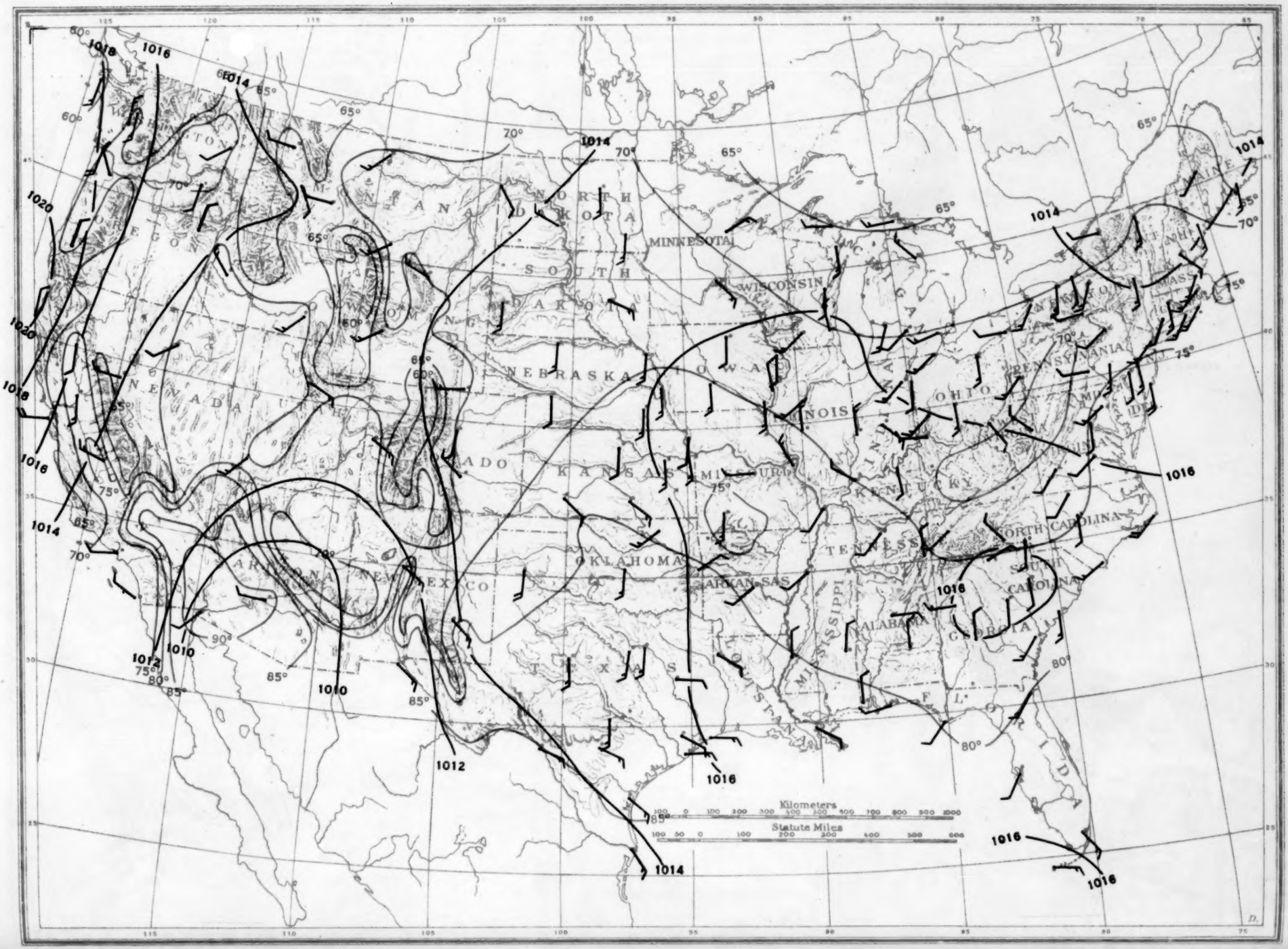
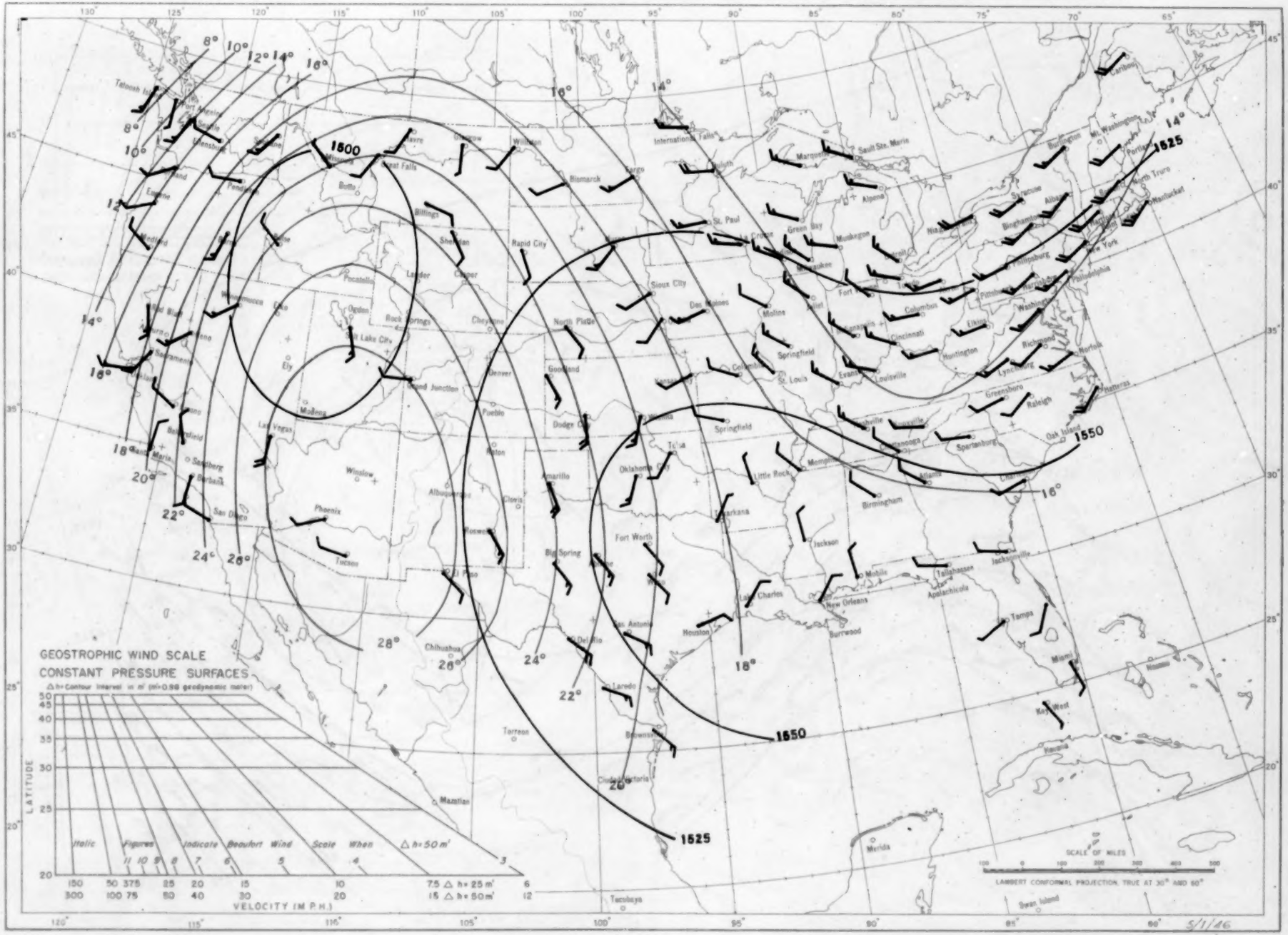


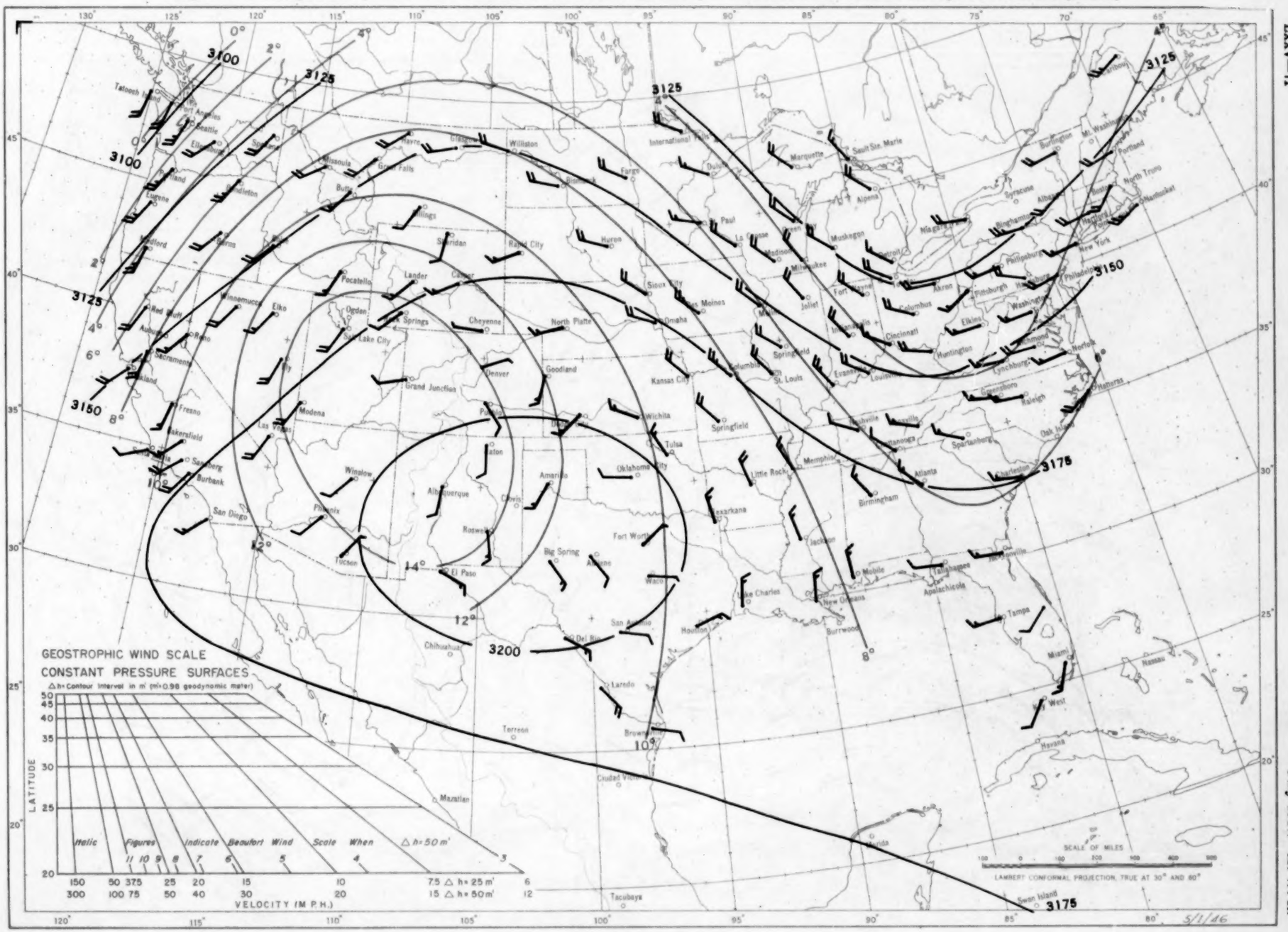
Chart VIII. July 1947.—Contour Lines of Dynamic Height (Geopotential) in Units of 0.98 Dynamic Meters and Isotherms in

Chart VIII, July 1947. Contour Lines of Dynamic Height (Geopotential) in Units of 0.98 Dynamic Meters and Isotherms in Degrees Centigrade for the 850-millibar Pressure Surface, and Resultant Winds at 1,500 Meters (m.s.l.)



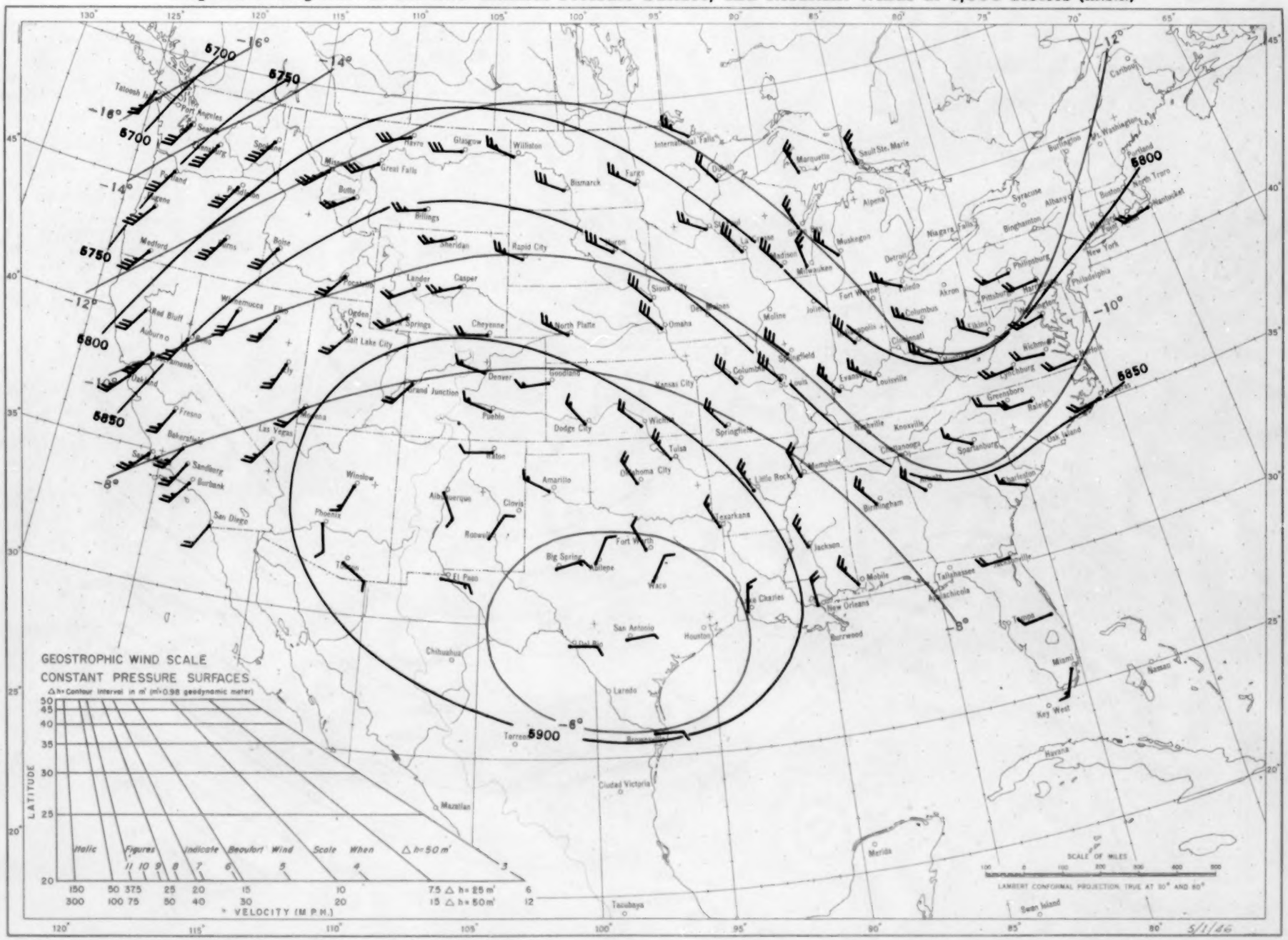
Contour lines and isotherms based on radiosonde observations at 0300 G.C.T., and winds based on pilot balloon observations at 2200 G.C.T.

Chart IX, July 1947. Contour Lines of Dynamic Height (Geopotential) in Units of 0.98 Dynamic Meters and Isotherms in Degrees Centigrade for the 700–millibar Pressure Surface, and Resultant Winds at 3,000 Meters (m.s.l.)



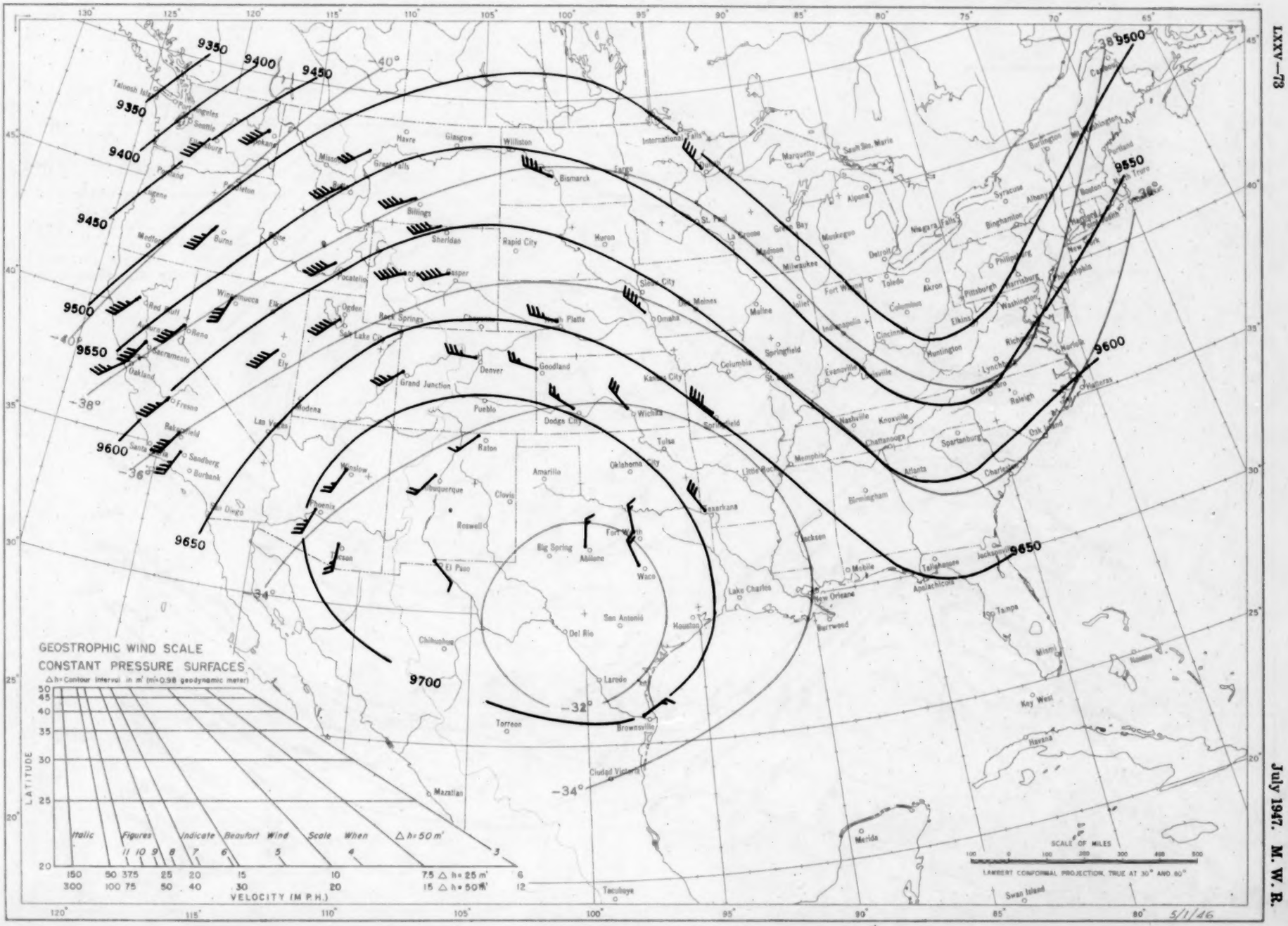
Contour lines and isotherms based on radiosonde observations at 0300 G.C.T., and winds based on pilot balloon observations at 2200 G.C.T.

Chart X, July 1947. Contour Lines of Dynamic Height (Geopotential) in Units of 0.98 Dynamic Meters and Isotherms in Degrees Centigrade for the 500-millibar Pressure Surface, and Resultant Winds at 5,000 Meters (m.s.l.)



Contour lines and isotherms based on radiosonde observations at 0300 G.C.T., and winds based on pilot balloon observations at 2200 G.C.T.

Chart XI, July 1947. Contour Lines of Dynamic Height (Geopotential) in Units of 0.98 Dynamic Meters and Isotherms in Degrees Centigrade for the 300–millibar Pressure Surface, and Resultant Winds at 10,000 Meters (m.s.l.)



Contour lines and isotherms based on radiosonde observations at 0300 G.C.T., and winds based on pilot balloon observations at 2200 G.C.T.